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**Department of Defense
Fiscal Year (FY) 2019 Budget Estimates**

February 2018



Missile Defense Agency

Defense-Wide Justification Book Volume 2a of 5

Research, Development, Test & Evaluation, Defense-Wide

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Missile Defense Agency • Budget Estimates FY 2019 • RDT&E Program

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Introduction & Explanation of Contents

The Department of Defense Fiscal Year (FY) 2019 Budget Estimate Submission RDT&E (Includes Procurement, O&M, and MILCON), Defense-wide Volume 2, Missile Defense Agency (MDA) justification materials consists of two books titled Volume 2a and 2b. Justification documents are provided in the books as listed below.

Volume 2a

- R-1 Comptroller Exhibit
- MDA FY 2019 Budget Estimate Overview
- MDA Appropriation Summary
- Acronyms
- RDT&E Exhibits in BA-03, BA-04, and BA-06

Volume 2b

- P-1 Comptroller Exhibit
- MDA Operations and Maintenance Exhibit
- MDA MILCON Exhibits
- MDA Multi-Year Procurement Exhibit
- MDA Procurement Exhibits

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Department of Defense
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 Exhibit R-1 FY 2019 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

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Appropriation	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO
Research, Development, Test & Eval, DW	6,201,226	6,200,711	6,200,711		
Total Research, Development, Test & Evaluation	6,201,226	6,200,711	6,200,711		

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Appropriation	FY 2018	FY 2018	FY 2018	FY 2018	FY 2018	
	Emergency Requests**	Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	Remaining Req Emergency	Total PB Requests* with CR Adj Base + OCO + Emergency**	Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	Remaining Req with CR Adj Base + OCO + Emergency
Research, Development, Test & Eval, DW	597,500	-597,500		6,798,211	-597,500	6,200,711
Total Research, Development, Test & Evaluation	597,500	-597,500		6,798,211	-597,500	6,200,711

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Appropriation -----	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Research, Development, Test & Eval, DW	6,777,299		6,777,299
Total Research, Development, Test & Evaluation	6,777,299		6,777,299

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	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO
<u>Summary Recap of Budget Activities</u>					
Advanced Technology Development	159,515	291,554	291,554		
Advanced Component Development And Prototypes	5,924,276	5,879,210	5,879,210		
Management Support	117,435	29,947	29,947		
Total Research, Development, Test & Evaluation	6,201,226	6,200,711	6,200,711		
<u>Summary Recap of FYDP Programs</u>					
Intelligence and Communications	945	986	986		
Research and Development	6,169,588	6,117,877	6,117,877		
Administration and Associated Activities	30,693	29,947	29,947		
Space		51,901	51,901		
Total Research, Development, Test & Evaluation	6,201,226	6,200,711	6,200,711		

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	FY 2018 Emergency Requests**	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency
Summary Recap of Budget Activities -----						
Advanced Technology Development				291,554		291,554
Advanced Component Development And Prototypes	597,500	-597,500		6,476,710	-597,500	5,879,210
Management Support				29,947		29,947
Total Research, Development, Test & Evaluation	597,500	-597,500		6,798,211	-597,500	6,200,711
 Summary Recap of FYDP Programs -----						
Intelligence and Communications				986		986
Research and Development	583,500	-583,500		6,701,377	-583,500	6,117,877
Administration and Associated Activities				29,947		29,947
Space	14,000	-14,000		65,901	-14,000	51,901
Total Research, Development, Test & Evaluation	597,500	-597,500		6,798,211	-597,500	6,200,711

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Summary Recap of Budget Activities	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Advanced Technology Development	223,135		223,135
Advanced Component Development And Prototypes	6,522,138		6,522,138
Management Support	32,026		32,026
Total Research, Development, Test & Evaluation	6,777,299		6,777,299
Summary Recap of FYDP Programs			
Intelligence and Communications	985		985
Research and Development	6,694,249		6,694,249
Administration and Associated Activities	28,626		28,626
Space	53,439		53,439
Total Research, Development, Test & Evaluation	6,777,299		6,777,299

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Advanced Component Development And Prototypes	597,500	-597,500		6,476,710	-597,500	5,879,210
Management Support				29,947		29,947
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<u>Summary Recap of FYDP Programs</u>						
Intelligence and Communications				986		986
Research and Development	583,500	-583,500		6,701,377	-583,500	6,117,877
Administration and Associated Activities				29,947		29,947
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Total Research, Development, Test & Evaluation	597,500	-597,500		6,798,211	-597,500	6,200,711

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		PB Request with CR Adj Base	Total PB Requests* with CR Adj Base	PB Request with CR Adj OCO	Total PB Requests+ with CR Adj OCO
Missile Defense Agency	6,201,226	6,200,711	6,200,711		
Total Research, Development, Test & Evaluation	6,201,226	6,200,711	6,200,711		

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	Emergency Requests**	Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	Remaining Req Emergency	Total PB Requests* with CR Adj Base + OCO + Emergency**	Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	Remaining Req with CR Adj Base + OCO + Emergency
-----	-----	-----	-----	-----	-----	
Missile Defense Agency	597,500	-597,500		6,798,211	-597,500	6,200,711
Total Research, Development, Test & Evaluation	597,500	-597,500		6,798,211	-597,500	6,200,711

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Missile Defense Agency	6,777,299		6,777,299
Total Research, Development, Test & Evaluation	6,777,299		6,777,299

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Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	ec
28	0603176C	Advanced Concepts and Performance Assessment	03	14,534	12,996	12,996			U
29	0603178C	Weapons Technology	03	47,403	5,495	5,495			U
30	0603179C	Advanced C4ISR	03	3,489					U
31	0603180C	Advanced Research	03	27,185	20,184	20,184			U
33	0603274C	Special Program - MDA Technology	03	12,509					U
39	0603294C	Common Kill Vehicle Technology	03	54,395	252,879	252,879			U
		Advanced Technology Development		159,515	291,554	291,554			
72	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	197,171	230,162	230,162			U
73	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	1,034,861	828,097	828,097			U
75	0603884C	Ballistic Missile Defense Sensors	04	252,665	247,345	247,345			U
76	0603890C	BMD Enabling Programs	04	435,203	449,442	449,442			U
77	0603891C	Special Programs - MDA	04	289,364	320,190	320,190			U
78	0603892C	AEGIS BMD	04	889,489	852,052	852,052			U
79	0603893C	Space Tracking & Surveillance System	04	37,809					U
80	0603895C	Ballistic Missile Defense System Space Programs	04	20,910					U
81	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	465,433	430,115	430,115			U

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Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2018 Emergency Requests**	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency	S
28	0603176C	Advanced Concepts and Performance Assessment	03				12,996		12,996	U
29	0603178C	Weapons Technology	03				5,495		5,495	U
30	0603179C	Advanced C4ISR	03							U
31	0603180C	Advanced Research	03				20,184		20,184	U
33	0603274C	Special Program - MDA Technology	03							U
39	0603294C	Common Kill Vehicle Technology	03				252,879		252,879	U
	Advanced Technology Development						291,554		291,554	
72	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	62,100	-62,100		292,262	-62,100	230,162	U
73	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	129,000	-129,000		957,097	-129,000	828,097	U
75	0603884C	Ballistic Missile Defense Sensors	04	30,800	-30,800		278,145	-30,800	247,345	U
76	0603890C	BMD Enabling Programs	04	16,200	-16,200		465,642	-16,200	449,442	U
77	0603891C	Special Programs - MDA	04	45,000	-45,000		365,190	-45,000	320,190	U
78	0603892C	AEGIS BMD	04	8,736	-8,736		860,788	-8,736	852,052	U
79	0603893C	Space Tracking & Surveillance System	04							U
80	0603895C	Ballistic Missile Defense System Space Programs	04							U
81	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	24,747	-24,747		454,862	-24,747	430,115	U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Se
28	0603176C	Advanced Concepts and Performance Assessment	03	13,017		13,017	U
29	0603178C	Weapons Technology	03				U
30	0603179C	Advanced C4ISR	03				U
31	0603180C	Advanced Research	03	20,365		20,365	U
33	0603274C	Special Program - MDA Technology	03				U
39	0603294C	Common Kill Vehicle Technology	03	189,753		189,753	U
		Advanced Technology Development		223,135		223,135	
72	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	214,173		214,173	U
73	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	926,359		926,359	U
75	0603884C	Ballistic Missile Defense Sensors	04	220,876		220,876	U
76	0603890C	BMD Enabling Programs	04	540,926		540,926	U
77	0603891C	Special Programs - MDA	04	422,348		422,348	U
78	0603892C	AEGIS BMD	04	767,539		767,539	U
79	0603893C	Space Tracking & Surveillance System	04				U
80	0603895C	Ballistic Missile Defense System Space Programs	04				U
81	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	475,168		475,168	U

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	S e c
82	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	47,402	48,954	48,954			U
83	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04	53,483	53,265	53,265			U
84	0603906C	Regarding Trench	04	7,303	9,113	9,113			U
85	0603907C	Sea Based X-Band Radar (SBX)	04	115,201	130,695	130,695			U
86	0603913C	Israeli Cooperative Programs	04	268,735	105,354	105,354			U
87	0603914C	Ballistic Missile Defense Test	04	294,441	305,791	305,791			U
88	0603915C	Ballistic Missile Defense Targets	04	521,784	410,425	410,425			U
92	0604115C	Technology Maturation Initiatives	04	84,514	128,406	128,406			U
95	0604181C	Hypersonic Defense	04		75,300	75,300			U
100	0604673C	Pacific Discriminating Radar	04						U
104	0604873C	Long Range Discrimination Radar (LRDR)	04	186,172	357,659	357,659			U
105	0604874C	Improved Homeland Defense Interceptors	04	247,362	465,530	465,530			U
106	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	57,567	36,239	36,239			U
107	0604878C	Aegis BMD Test	04	131,012	134,468	134,468			U
108	0604879C	Ballistic Missile Defense Sensor Test	04	81,376	84,239	84,239			U
109	0604880C	Land-Based SM-3 (LBSM3)	04	40,452	30,486	30,486			U
110	0604881C	AEGIS SM-3 Block IIA Co-Development	04	102,272	9,739	9,739			U

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Line No	Program Element Number	Item	Act	FY 2018 Emergency Requests**	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency	S e c
82	0603898C	Ballistic Missile Defense Joint Warfighter Support	04				48,954		48,954	U
83	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04				53,265		53,265	U
84	0603906C	Regarding Trench	04				9,113		9,113	U
85	0603907C	Sea Based X-Band Radar (SBX)	04	15,000	-15,000		145,695	-15,000	130,695	U
86	0603913C	Israeli Cooperative Programs	04				105,354		105,354	U
87	0603914C	Ballistic Missile Defense Test	04	10,402	-10,402		316,193	-10,402	305,791	U
88	0603915C	Ballistic Missile Defense Targets	04	49,700	-49,700		460,125	-49,700	410,425	U
92	0604115C	Technology Maturation Initiatives	04				128,406		128,406	U
95	0604181C	Hypersonic Defense	04				75,300		75,300	U
100	0604673C	Pacific Discriminating Radar	04							U
104	0604873C	Long Range Discrimination Radar (LRDR)	04				357,659		357,659	U
105	0604874C	Improved Homeland Defense Interceptors	04	170,900	-170,900		636,430	-170,900	465,530	U
106	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04				36,239		36,239	U
107	0604878C	Aegis BMD Test	04	3,315	-3,315		137,783	-3,315	134,468	U
108	0604879C	Ballistic Missile Defense Sensor Test	04	17,600	-17,600		101,839	-17,600	84,239	U
109	0604880C	Land-Based SM-3 (LBSM3)	04				30,486		30,486	U
110	0604881C	AEGIS SM-3 Block IIA Co-Development	04				9,739		9,739	U

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82	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	48,767		48,767	U
83	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04	54,925		54,925	U
84	0603906C	Regarding Trench	04	16,916		16,916	U
85	0603907C	Sea Based X-Band Radar (SBX)	04	149,715		149,715	U
86	0603913C	Israeli Cooperative Programs	04	300,000		300,000	U
87	0603914C	Ballistic Missile Defense Test	04	365,681		365,681	U
88	0603915C	Ballistic Missile Defense Targets	04	517,852		517,852	U
92	0604115C	Technology Maturation Initiatives	04	148,822		148,822	U
95	0604181C	Hypersonic Defense	04	120,444		120,444	U
100	0604673C	Pacific Discriminating Radar	04	95,765		95,765	U
104	0604873C	Long Range Discrimination Radar (LRDR)	04	164,562		164,562	U
105	0604874C	Improved Homeland Defense Interceptors	04	561,220		561,220	U
106	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	61,017		61,017	U
107	0604878C	Aegis BMD Test	04	95,756		95,756	U
108	0604879C	Ballistic Missile Defense Sensor Test	04	81,001		81,001	U
109	0604880C	Land-Based SM-3 (LBSM3)	04	27,692		27,692	U
110	0604881C	AEGIS SM-3 Block IIA Co-Development	04				U

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	S e c
111	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	61,350	76,757	76,757			U
112	0604894C	Multi-Object Kill Vehicle	04		6,500	6,500			U
115	0305103C	Cyber Security Initiative	04	945	986	986			U
116	1206893C	Space Tracking & Surveillance System	04		34,907	34,907			U
117	1206895C	Ballistic Missile Defense System Space Programs	04		16,994	16,994			U
		Advanced Component Development And Prototypes		5,924,276	5,879,210	5,879,210			
154	0605502C	Small Business Innovation Research - MDA	06	86,742					U
169	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06						U
185	0901598C	Management HQ - MDA	06	30,693	29,947	29,947			U
		Management Support		117,435	29,947	29,947			
Total Research, Development, Test & Eval, DW				6,201,226	6,200,711	6,200,711			

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Line No	Program Element Number	Item	Act	FY 2018 Emergency Requests**	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency	S
111	0604887C	Ballistic Missile Defense Midcourse Segment Test	04				76,757		76,757	U
112	0604894C	Multi-Object Kill Vehicle	04				6,500		6,500	U
115	0305103C	Cyber Security Initiative	04				986		986	U
116	1206893C	Space Tracking & Surveillance System	04				34,907		34,907	U
117	1206895C	Ballistic Missile Defense System Space Programs	04	14,000	-14,000		30,994	-14,000	16,994	U
		Advanced Component Development And Prototypes		597,500	-597,500		6,476,710	-597,500	5,879,210	
154	0605502C	Small Business Innovation Research - MDA	06							U
169	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06							U
185	0901598C	Management HQ - MDA	06				29,947		29,947	U
		Management Support					29,947		29,947	
Total Research, Development, Test & Eval, DW				597,500	-597,500		6,798,211	-597,500	6,200,711	

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Se c
111	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	81,934		81,934	U
112	0604894C	Multi-Object Kill Vehicle	04	8,256		8,256	U
115	0305103C	Cyber Security Initiative	04	985		985	U
116	1206893C	Space Tracking & Surveillance System	04	36,955		36,955	U
117	1206895C	Ballistic Missile Defense System Space Programs	04	16,484		16,484	U
Advanced Component Development And Prototypes				6,522,138		6,522,138	
154	0605502C	Small Business Innovation Research - MDA	06				U
169	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06	3,400		3,400	U
185	0901598C	Management HQ - MDA	06	28,626		28,626	U
Management Support				32,026		32,026	
Total Research, Development, Test & Eval, DW				6,777,299		6,777,299	

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	S e c
28	0603176C	Advanced Concepts and Performance Assessment	03	14,534	12,996	12,996			U
29	0603178C	Weapons Technology	03	47,403	5,495	5,495			U
30	0603179C	Advanced C4ISR	03	3,489					U
31	0603180C	Advanced Research	03	27,185	20,184	20,184			U
33	0603274C	Special Program - MDA Technology	03	12,509					U
39	0603294C	Common Kill Vehicle Technology	03	54,395	252,879	252,879			U
		Advanced Technology Development		159,515	291,554	291,554			
72	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	197,171	230,162	230,162			U
73	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	1,034,861	828,097	828,097			U
75	0603884C	Ballistic Missile Defense Sensors	04	252,665	247,345	247,345			U
76	0603890C	BMD Enabling Programs	04	435,203	449,442	449,442			U
77	0603891C	Special Programs - MDA	04	289,364	320,190	320,190			U
78	0603892C	AEGIS BMD	04	889,489	852,052	852,052			U
79	0603893C	Space Tracking & Surveillance System	04	37,809					U
80	0603895C	Ballistic Missile Defense System Space Programs	04	20,910					U
81	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	465,433	430,115	430,115			U

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Line No	Program Element Number	Item	Act	FY 2018 Emergency Requests**	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency	S c
28	0603176C	Advanced Concepts and Performance Assessment	03				12,996		12,996	U
29	0603178C	Weapons Technology	03				5,495		5,495	U
30	0603179C	Advanced C4ISR	03							U
31	0603180C	Advanced Research	03				20,184		20,184	U
33	0603274C	Special Program - MDA Technology	03							U
39	0603294C	Common Kill Vehicle Technology	03				252,879		252,879	U
Advanced Technology Development							291,554		291,554	
72	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	62,100	-62,100		292,262	-62,100	230,162	U
73	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	129,000	-129,000		957,097	-129,000	828,097	U
75	0603884C	Ballistic Missile Defense Sensors	04	30,800	-30,800		278,145	-30,800	247,345	U
76	0603890C	BMD Enabling Programs	04	16,200	-16,200		465,642	-16,200	449,442	U
77	0603891C	Special Programs - MDA	04	45,000	-45,000		365,190	-45,000	320,190	U
78	0603892C	AEGIS BMD	04	8,736	-8,736		860,788	-8,736	852,052	U
79	0603893C	Space Tracking & Surveillance System	04							U
80	0603895C	Ballistic Missile Defense System Space Programs	04							U
81	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	24,747	-24,747		454,862	-24,747	430,115	U

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28	0603176C	Advanced Concepts and Performance Assessment	03	13,017		13,017	U
29	0603178C	Weapons Technology	03				U
30	0603179C	Advanced C4ISR	03				U
31	0603180C	Advanced Research	03	20,365		20,365	U
33	0603274C	Special Program - MDA Technology	03				U
39	0603294C	Common Kill Vehicle Technology	03	189,753		189,753	U
		Advanced Technology Development		223,135		223,135	
72	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	214,173		214,173	U
73	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	926,359		926,359	U
75	0603884C	Ballistic Missile Defense Sensors	04	220,876		220,876	U
76	0603890C	BMD Enabling Programs	04	540,926		540,926	U
77	0603891C	Special Programs - MDA	04	422,348		422,348	U
78	0603892C	AEGIS BMD	04	767,539		767,539	U
79	0603893C	Space Tracking & Surveillance System	04				U
80	0603895C	Ballistic Missile Defense System Space Programs	04				U
81	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	475,168		475,168	U

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	S e c
82	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	47,402	48,954	48,954			U
83	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04	53,483	53,265	53,265			U
84	0603906C	Regarding Trench	04	7,303	9,113	9,113			U
85	0603907C	Sea Based X-Band Radar (SBX)	04	115,201	130,695	130,695			U
86	0603913C	Israeli Cooperative Programs	04	268,735	105,354	105,354			U
87	0603914C	Ballistic Missile Defense Test	04	294,441	305,791	305,791			U
88	0603915C	Ballistic Missile Defense Targets	04	521,784	410,425	410,425			U
92	0604115C	Technology Maturation Initiatives	04	84,514	128,406	128,406			U
95	0604181C	Hypersonic Defense	04		75,300	75,300			U
100	0604673C	Pacific Discriminating Radar	04						U
104	0604873C	Long Range Discrimination Radar (LRDR)	04	186,172	357,659	357,659			U
105	0604874C	Improved Homeland Defense Interceptors	04	247,362	465,530	465,530			U
106	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	57,567	36,239	36,239			U
107	0604878C	Aegis BMD Test	04	131,012	134,468	134,468			U
108	0604879C	Ballistic Missile Defense Sensor Test	04	81,376	84,239	84,239			U
109	0604880C	Land-Based SM-3 (LBSM3)	04	40,452	30,486	30,486			U
110	0604881C	AEGIS SM-3 Block IIA Co-Development	04	102,272	9,739	9,739			U

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Line No	Program Element Number	Item	Act	FY 2018 Emergency Requests**	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency	S
82	0603898C	Ballistic Missile Defense Joint Warfighter Support	04				48,954		48,954	U
83	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04				53,265		53,265	U
84	0603906C	Regarding Trench	04				9,113		9,113	U
85	0603907C	Sea Based X-Band Radar (SBX)	04	15,000	-15,000		145,695	-15,000	130,695	U
86	0603913C	Israeli Cooperative Programs	04				105,354		105,354	U
87	0603914C	Ballistic Missile Defense Test	04	10,402	-10,402		316,193	-10,402	305,791	U
88	0603915C	Ballistic Missile Defense Targets	04	49,700	-49,700		460,125	-49,700	410,425	U
92	0604115C	Technology Maturation Initiatives	04				128,406		128,406	U
95	0604181C	Hypersonic Defense	04				75,300		75,300	U
100	0604673C	Pacific Discriminating Radar	04							U
104	0604873C	Long Range Discrimination Radar (LRDR)	04				357,659		357,659	U
105	0604874C	Improved Homeland Defense Interceptors	04	170,900	-170,900		636,430	-170,900	465,530	U
106	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04				36,239		36,239	U
107	0604878C	Aegis BMD Test	04	3,315	-3,315		137,783	-3,315	134,468	U
108	0604879C	Ballistic Missile Defense Sensor Test	04	17,600	-17,600		101,839	-17,600	84,239	U
109	0604880C	Land-Based SM-3 (LBSM3)	04				30,486		30,486	U
110	0604881C	AEGIS SM-3 Block IIA Co-Development	04				9,739		9,739	U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Se
82	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	48,767		48,767	U
83	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04	54,925		54,925	U
84	0603906C	Regarding Trench	04	16,916		16,916	U
85	0603907C	Sea Based X-Band Radar (SBX)	04	149,715		149,715	U
86	0603913C	Israeli Cooperative Programs	04	300,000		300,000	U
87	0603914C	Ballistic Missile Defense Test	04	365,681		365,681	U
88	0603915C	Ballistic Missile Defense Targets	04	517,852		517,852	U
92	0604115C	Technology Maturation Initiatives	04	148,822		148,822	U
95	0604181C	Hypersonic Defense	04	120,444		120,444	U
100	0604673C	Pacific Discriminating Radar	04	95,765		95,765	U
104	0604873C	Long Range Discrimination Radar (LRDR)	04	164,562		164,562	U
105	0604874C	Improved Homeland Defense Interceptors	04	561,220		561,220	U
106	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	61,017		61,017	U
107	0604878C	Aegis BMD Test	04	95,756		95,756	U
108	0604879C	Ballistic Missile Defense Sensor Test	04	81,001		81,001	U
109	0604880C	Land-Based SM-3 (LBSM3)	04	27,692		27,692	U
110	0604881C	AEGIS SM-3 Block IIA Co-Development	04				U

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	S e c
111	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	61,350	76,757	76,757			U
112	0604894C	Multi-Object Kill Vehicle	04		6,500	6,500			U
115	0305103C	Cyber Security Initiative	04	945	986	986			U
116	1206893C	Space Tracking & Surveillance System	04		34,907	34,907			U
117	1206895C	Ballistic Missile Defense System Space Programs	04		16,994	16,994			U
	Advanced Component Development And Prototypes			5,924,276	5,879,210	5,879,210			
154	0605502C	Small Business Innovation Research - MDA	06	86,742					U
169	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06						U
185	0901598C	Management HQ - MDA	06	30,693	29,947	29,947			U
	Management Support			117,435	29,947	29,947			
Total Missile Defense Agency				6,201,226	6,200,711	6,200,711			

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Line No	Program Element Number	Item	Act	FY 2018	FY 2018	FY 2018	FY 2018	FY 2018	S	
				Emergency Requests**	Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	Remaining Req Emergency	Total PB Requests* with CR Adj Base + OCO + Emergency**	Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs		Remaining Req with CR Adj Base + OCO + Emergency
111	0604887C	Ballistic Missile Defense Midcourse Segment Test	04				76,757		76,757	U
112	0604894C	Multi-Object Kill Vehicle	04				6,500		6,500	U
115	0305103C	Cyber Security Initiative	04				986		986	U
116	1206893C	Space Tracking & Surveillance System	04				34,907		34,907	U
117	1206895C	Ballistic Missile Defense System Space Programs	04	14,000	-14,000		30,994	-14,000	16,994	U
		Advanced Component Development And Prototypes		597,500	-597,500		6,476,710	-597,500	5,879,210	
154	0605502C	Small Business Innovation Research - MDA	06							U
169	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06							U
185	0901598C	Management HQ - MDA	06				29,947		29,947	U
		Management Support					29,947		29,947	
Total Missile Defense Agency				597,500	-597,500		6,798,211	-597,500	6,200,711	

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Line No	Element Number	Program Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Se
111	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	81,934		81,934	U
112	0604894C	Multi-Object Kill Vehicle	04	8,256		8,256	U
115	0305103C	Cyber Security Initiative	04	985		985	U
116	1206893C	Space Tracking & Surveillance System	04	36,955		36,955	U
117	1206895C	Ballistic Missile Defense System Space Programs	04	16,484		16,484	U
		Advanced Component Development And Prototypes		6,522,138		6,522,138	
154	0605502C	Small Business Innovation Research - MDA	06				U
169	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06	3,400		3,400	U
185	0901598C	Management HQ - MDA	06	28,626		28,626	U
		Management Support		32,026		32,026	
Total Missile Defense Agency				6,777,299		6,777,299	

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33	03	0603274C	Special Program - MDA Technology.....	Volume 2a - 33
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81	04	0603896C	Ballistic Missile Defense Command and Control, Battle Management & Communication.....	Volume 2a - 353
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**Missile Defense Agency
Fiscal Year (FY) 2019
Budget Estimates**

OVERVIEW



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The Missile Defense Agency (MDA) requests \$9.9 billion in Fiscal Year (FY) 2019.

MDA fully supports the National Defense Strategy with its FY 2019 President's Budget request, allowing the nation to: Compete, Deter, and Win. MDA will support the strategy with the continued development and deployment of an integrated, layered missile defense system to defeat current and projected missile threats.

An ICBM can travel at extremely high speeds—at times more than 15,000 mph, or almost 20 times the speed of sound. Kinetic energy interceptors can travel fast enough to create closing speeds exceeding 25,000 mph. The speeds, trajectories, and points of launch that must be considered always change. In missile defense, everything is about precision. The BMDS must not only work in terms of milliseconds, but the missiles and warheads the system is targeting have bull's-eyes measured in centimeters.

The FY 2019 request supports missile defense acceleration initiated in the FY 2017 Above Threshold Reprogramming (ATR) and the FY 2018 Budget Amendment (BA). The BA addresses the rapidly developing threat by increasing current capacity, expanding the sensor network and accelerating missile defense technology development. Recent escalation of the threat from North Korea has demonstrated an advanced and accelerated capability. The FY 2018 Budget Amendment request, for MDA, is in direct response to this increased threat.

Nearly all of our adversaries are concerned with U.S. missile defenses and are devising various means aimed at complicating missile defense operations. North Korea is committed to developing a long-range, nuclear-armed missile that is capable of posing a direct threat to the United States. In July 2017, North Korea launched two Hwasong-14 intercontinental ballistic missiles (ICBMs) that impacted in

the Sea of Japan, and on 28 November it launched another, larger Hwasong-15 ICBM on a highly-lofted trajectory that, at a lower trajectory, could theoretically reach all of the continental United States. Over the past year North Korea conducted an aggressive intermediate-range ballistic missile testing campaign and is developing a cold-launched, solid-fueled submarine-launched ballistic missile. Today North Korea fields hundreds of Scud and No Dong missiles that can reach U.S. forces forward deployed to the Republic of Korea and Japan. Iran is fielding increased numbers of theater ballistic missiles, improving its existing inventory, and is developing technical capabilities to produce an ICBM, and this effort is benefiting from its ballistic missile and space launch vehicle programs. Iran's ballistic missiles are capable of striking targets throughout the region, ranging as far as southeastern Europe.

The FY 2019 MDA request strengthens and expands the defenses for our nation, deployed forces, allies, and international partners against increasingly capable missile threats. The missile defense program will continue to support the warfighter and needs of the Combatant Commanders with the development, testing, deployment, integration and sustainment of interceptors, sensors, and the command, control, battle management and communications (C2BMC) system for the Ballistic Missile Defense System (BMDS). The program continues to invest in homeland and regional missile defense priorities and in advanced technology development and future capabilities to counter the proliferation of increasingly complex and diverse threats. The Missile Defense Agency is aware of the growing cyber threat and is aggressively working to ensure the nation's missile defenses are resilient and able to operate in a highly contested cyber environment. MDA remains focused on supporting the DoD Cybersecurity Campaign through implementation of the DoD Cybersecurity Discipline Implementation Plan.

The following discussion provides a summary of highlights of the major program elements, but does not necessarily examine all funding and activities included within each program element.

I. Homeland Defense

With this budget request, MDA expands homeland defense while operating, sustaining, and improving our nation's homeland missile defenses. The request includes:

- **Ground-based Midcourse Defense (GMD) (PE 0603882C).** MDA is requesting \$926.4 million in FY 2019. MDA will work to strengthen and expand homeland missile defense by continuing a new missile field (MILCON funded in FY18 BA) and deploying 20 additional Ground-Based Interceptors (GBI) at Ft. Greely, Alaska (FGA) bringing the total deployed GBIs from 44 to 64 in the 2023 timeframe. Additionally, MDA will ensure the number of fielded GBIs is sustained at 64 while performing GBI sustainment, upgrades and maintenance by adding two additional silos in Missile Field #1 at FGA and purchasing six additional Configuration 2 (C2) boost vehicles. The construction associated with addition of two silos will be accomplished with \$8 million of FY 2019 MILCON funds. MDA continues the development and expansion of long-range GMD capabilities. In November 2017, MDA emplaced the 44th GBI at Fort Greely, which completed the work to increase the number of operational GBI from 32 to 44, with 40 GBIs currently deployed at FGA, and four GBIs at Vandenberg Air Force Base (VAFB) in California. MDA will upgrade the capability of key Ground Systems and Fire Control systems components such as the GMD Fire Control (GFC) equipment, the GMD Communications Network (GCN). The GFC upgrades will enable On-Demand Communications (ODC) required for the Redesigned Kill Vehicle (RKV), BMDS System Track, 2- or/3-stage selectable GBI battle management, Mid-Term Discrimination

enhancements, and other GFC-Warfighter interface and logic improvements. Technology modernization will mitigate obsolescence issues, improve cybersecurity resilience, increase GFC capabilities for emerging threat and raid size, reduce life-cycle cost, increase system reliability and operational availability, and simplify the insertion of future technologies. Additionally, this PE provides funding for System Engineering and Integration to include requirements development and analysis, modeling and simulation (M&S) development, M&S verification, validation, and accreditation, and software independent verification and analysis.

- **Improved Homeland Defense Interceptors (PE 0604874C).** MDA is requesting \$561.2 million in FY2019. The RKV will make homeland defenses more robust, help address the evolving threat, enhance kill vehicle reliability, improve in-flight communications to better leverage off-board sensor data, and enhance Combatant Commanders' situational awareness via additional hit/kill assessment messages. We anticipate deploying the RKV beginning in the 2021 timeframe in the new missile field at Fort Greely, AK. MDA is also beginning the development of a new booster, the Configuration 3 (C3) booster, which improves upon the C2 booster design by addressing obsolescence and enhancing survivability.
- **GMD Procurement.** MDA is requesting \$524 million in FY 2019 to support the construction of 20 additional silos and the emplacement of 20 additional GBIs at Fort Greely, AK.
- **Ground-based Midcourse Defense Test (PE 0604887C).** MDA is requesting \$81.9 million in FY 2019. This GMD Test program supports the Integrated Master Test Plan (IMTP). On May 30, 2017, MDA successfully intercepted an intercontinental ballistic missile target with countermeasures during a test of the GMD element of the BMDS. The test demonstrated a GBI configuration

with a three-stage C2 booster vehicle and a CE-II Block 1 Exo-atmospheric Kill Vehicle (EKV) that contains alternate divert thrusters. This budget request includes funding a GBI salvo test in FY 2019. MDA will also conduct a Controlled Test Vehicle test, a non-intercept flight characterization mission using an air-launched intermediate range ballistic missile to collect RKV flight environment data using a GBI launched from VAFB in FY 2020. The budget also includes execution of ground test campaigns to support fielding of new BMDS capabilities.

- **GMD Maintenance and Sustainment.** MDA is requesting \$147.2 million in FY 2019 for the Operation and Maintenance (O&M) of the GMD weapon system. This includes operations, maintenance and sustainment of the GMD weapon system and operational and support facilities at FGA and VAFB. It also includes Warfighter training, wargames, and exercises to improve readiness.
- **Long Range Discrimination Radar (LRDR) (PE 0604873C).** MDA is requesting \$164.6 million in FY 2019. The LRDR is a midcourse sensor that will improve BMDS target discrimination capability while supporting more efficient use of the GMD interceptor inventory. In FY 2019, MDA will complete the receipt of LRDR hardware, manufacturing and assembly of Array #1 and #2 and factory acceptance testing (FAT) on the arrays. MDA will initiate emplacement/installation and calibration of the first delivered array on-site at Clear Air Force Station (CAFS), AK. The LRDR site will be constructed as two separate military construction (MILCON) projects. Phase 1 (\$155 million, FY 2017) funded a Shielded Mission Control Facility and Radar Foundation. MDA began military construction of Phase 1 in FY 2017. Phase 2 (\$174 million, FY 2019) funds the shielded Power Plant that includes fuel storage, a maintenance facility, and associated site support, beginning in FY 2019. Initial fielding of the LRDR is planned for 2020 leading to an operational readiness acceptance by the warfighter in the 2022 timeframe.

- **Pacific Discriminating Radar (PE 0604673C).** MDA is requesting \$95.8M in FY19 to design and build two discriminating radars in the Pacific. For the first radar, called the Homeland Defense Radar - Hawaii (HDR-H), MDA is requesting \$62.2 million in FY 2019 (Budget Project MD41). The HDR-H radar will provide a persistent long-range acquisition and discrimination capability, augmented by other sensors, to mitigate the effects of evolving threats to the BMDS. The HDR-H optimizes discrimination capability in the Pacific architecture and increases the ability of GBIs to enhance the defense of Hawaii. The radar also supports additional mission areas including Space Situational Awareness. MDA plans to competitively award this radar by the end of FY 2018 as delivery order #1 on a fixed-price indefinite delivery/indefinite quantity (IDIQ) contract to manage, develop, build and integrate, test, and field the radar prime mission equipment. Scope includes options for limited term sustainment during transition and transfer to the lead service. The radar prime contractor will deliver a full technical data package which will enable the government to effectively and affordably sustain the system. The HDR-H will complete initial fielding in FY 2023 for BMDS integration, testing and readiness for operations. MDA will begin military construction for the HDR-H in FY 2021. The radar will be constructed in two phases: Phase 1 (FY 2021, \$138 million) funds a shielded Mission Control Facility and will begin military construction in FY 2021 and Phase 2 (FY 2022, \$183 million) funds the shielded power plant including fuel storage and associated site support. MDA is also requesting \$33.5 million in FY 2019 for the Homeland Defense Radar - Pacific (HDR-P) radar (Budget Project MD51). In FY 2019, MDA will initiate prime contract award and developmental engineering for radar hardware, software and equipment shelter. The HDR-P provides persistent midcourse discrimination, precision tracking, and hit assessment to support the defense of the homeland against long-range missile threats. Siting surveys efforts are planned to satisfy

warfighter requirements and determine the final recommended site(s). The radar also supports additional mission areas including space situational awareness upon approval. The military construction for the Pacific radar is planned for the FY 2022 timeframe and the HDR-P is scheduled to complete initial fielding in the FY 2024 timeframe.

- **Sea-Based X-band (SBX) (PE 0603907C).** MDA is requesting \$149.7 million in FY 2019. The SBX radar provides precision midcourse tracking, debris mitigation, and discrimination capabilities. The SBX is an integral component in our flight test programs. To address the increased missile threat from North Korea, our budget request includes funds to extend at-sea time from 120 to 330 days and conduct operations for defense of the homeland in the U.S. Pacific Command and U.S. Northern Command areas of responsibility. MDA continues with the x86 X-Band Radar (XBR) superdome replacement to address obsolete equipment and increase the XBR processing capabilities. The replacement superdome will be fielded in the 2021 timeframe. We will also complete implementation of a DoD regional clock for the BMDS to improve warfighter readiness by ensuring integrity and availability of timing data.

II. Regional Defense

The FY 2019 President's Budget reflects the Department's commitment to building regional missile defense forces that are interoperable with systems deployed by international partners. MDA responded to the U.S. Forces Korea Commander's urgent requirement requesting integration of the Lower Tier and Upper Tier missile defense systems to improve defensive capability through a more efficient and effective use of the systems available in theater. This requirement is supported by United States Strategic Command (USSTRATCOM)

and approved by the Chairman of the Joint Chiefs of Staff (CJCS). MDA continues this urgent work for the U.S. Pacific Command (USPACOM) Joint Emergent Operational Need (JEON). In coordination with the Army's Lower Tier Program Office, MDA began a concerted effort in May 2017 to develop an integrated, phased approach to incrementally field capability. This JEON will deliver improved BMDS capability to the Korean Peninsula, including integration of existing BMD assets to improve engagement options and coverage.

We continue to support the European Phased Adaptive Approach (EPAA) designed to protect U.S. deployed forces and NATO allies in Europe from ballistic missile attacks from the Middle East. EPAA Phase 2, including Aegis Ashore Missile Defense System Romania is mission-capable today. MDA will further enhance defensive coverage for NATO Europe against medium- and intermediate-range threats with the completion of EPAA Phase 3, including deployment of an Aegis Ashore site in Poland and the delivery of the Standard Missile (SM)-3 Block IIA and associated Aegis BMD weapon system upgrades for Aegis BMD ships and Aegis Ashore sites. The U.S. Navy will continue to operate the Aegis Ashore site in Romania as an integral part of NATO's BMD architecture, which includes a forward-based Army Navy/Transportable Radar Surveillance System (AN/TPY-2) in Turkey, BMD-capable Aegis destroyers homeported in Rota, Spain, SM-3 interceptors, and a command-and-control node operated from Ramstein Air Base, Germany. MDA proposes funding the development, testing, operations and sustainment of the Aegis BMD Program. The request includes:

- **Aegis BMD (PE 0603892C).** MDA requests \$767.5 million in FY 2019. The program includes the integration of the SM-3 Block IIA into the Aegis BMD weapon system, transition of the Kinetic Warhead hardware commonality effort to system integration

testing, and pre-production of all-up-rounds to support initial deployment for EPAA Phase 3. MDA is strongly committed to maintaining and enhancing the Aegis BMD weapon system capability alignment with Navy requirements to improve performance against SRBM, MRBM, and IRBM threats. Utilizing improved radar discrimination, Aegis BMD will increase capability against longer range and more sophisticated threats. MDA continues software development for Integrated Air and Missile Defense (IAMD) Baseline 9.C2 (BMD 5.1) in support of EPAA Phase 3 and the IAMD Baseline 10 (BMD 6.0). The BMD 6.0 computer upgrade will integrate BMD capability with Advanced Air and Missile Defense Radar (AMDR) data, also known as the AN/SPY-6, for enhanced engagement capability and increased raid capacity. Additionally, MDA continues upgrading the SM-3 Block IB hardware and software to leverage the capability of the SM-3 Block IIA.

- **Aegis BMD Testing (PE 0604878C).** MDA is requesting \$95.8 million in FY 2019. Aegis BMD Flight Test Program performs comprehensive testing of Aegis BMD components and demonstrates their interoperability with the BMDS. Using accredited modeling and simulation (M&S) the ground test program provides the evidence required for MDA and the Combatant Commanders to transition the capability to the operational capacity baseline. MDA plans to conduct flight tests using Aegis BMD weapon system 5.1 and the SM-3 Block IIA missiles. These development and operational tests support the U.S. Navy certifications as well as EPAA commitments. MDA will also conduct a flight test using Aegis Baseline 9.C2 SW demonstrating a data collection test against an MRBM with countermeasures.
- **Aegis Procurement.** MDA requests \$820.8 million in FY 2019 in procurement, including associated hardware and support costs. We request \$708.7 million to procure 37 SM-3 IB missiles and six SM-3 IIA missiles and \$15M to complete combat system and

combat structure adaption for the Aegis Ashore site in Poland. Each variant can be used on Aegis BMD ships and at the Aegis Ashore sites in Romania and Poland. The total SM-3 IB missile buy, across the FYDP, is 204 missiles. The total SM-3 IIA buy across the FYDP is 39 missiles. The request contains a five-year Multiyear Procurement, for SM-3 IB missiles, beginning in FY 2019 and ending in FY 2023. The procurement budget also requests \$97.1 million for Aegis BMD weapon systems consisting of Aegis shipset equipment, software and installation materials.

- **Operation and Maintenance (O&M.)** MDA is requesting \$83.8 million in FY 2019 to fund Aegis maintenance and support. The Aegis BMD program will perform missile recertification, repair efforts, demilitarization, and Ordnance Assessment / Surveillance. This funding supports BMD Computer Program, Ship Equipment, Aegis Ashore - Romania sustainment, and Fleet integration support.

Also key to regional defense capability, Terminal High Altitude Area Defense (THAAD) is a globally transportable, ground-based missile defense system that defends against short-, medium-, and intermediate-range ballistic missiles in the terminal stage of flight, both inside and outside the atmosphere. THAAD provides Combatant Commanders a rapidly deployable capability to deepen, extend, and complement BMDS homeland and regional defenses. MDA supports forward-deployment of one THAAD battery in Guam and one THAAD Battery in the Republic of Korea (ROK).

- **Terminal Defense (PE 0603881C).** MDA is requesting \$214.2 million for THAAD development efforts in FY 2019. Our THAAD development efforts include software upgrades to address threat packages and defense planning, as well as improved capability

to engage SRBM, MRBM and IRBM threats. Our development and integration will provide enhanced debris mitigation capability, improved interoperability with other BMDS elements, and expanded defended area footprints via remote operation of THAAD launchers. We will also complete developmental efforts to replace current global positioning system antennas to ensure the integrity and availability of positioning, navigation, and timing data for the THAAD weapon system. Finally, we continue efforts associated with the USFK JEON that provides enhanced THAAD capability against specific USFK threats, improved radar energy allocation, improved THAAD performance against debris and in complex environments, and an accelerated initial capability to increase its defended area.

- **Terminal Defense Testing (PE 0604876C).** MDA is requesting \$61.0 million for THAAD Testing in FY 2019. THAAD will participate in an operational flight test to demonstrate regional / theater integrated air and missile defense capabilities. This flight test incorporates THAAD Software Build 3.0, to include increased debris mitigation Phase 2, which will further demonstrate, in an operational scenario, THAAD's ability to conduct coordinated engagements with the Aegis BMD and PATRIOT weapon systems operating with command and control, battle management and communications (C2BMC) and forward-based AN/TPY-2 while engaging an IRBM with countermeasures. The operational flight test will also demonstrate interoperability with Patriot and respond to the 2016 National Defense Authorization Act for interoperability between US BMDS systems. We will also initiate pre-mission planning for a flight test to be conducted in FY 2020, to include key long- lead activities such as range safety and weapon system performance analysis.

THAAD Procurement. MDA is requesting \$874.1 million in FY 2019 for THAAD interceptor procurement, obsolescence mitigation and equipment. MDA plans to procure 82 THAAD interceptors in FY 2019 for a total buy of 196 THAAD interceptors across the FYDP.

- **Operations and Maintenance (O&M).** MDA will sustain and support the THAAD weapon system. MDA requests \$92.6 million in FY 2019 to support the maintenance and upkeep of all BMDS unique items in fielded THAAD Batteries, as well as for all THAAD training devices. In FY 2019 and throughout the FYDP MDA plans to provide support to seven THAAD batteries, including batteries deployed to Guam and ROK.

III. Developing New Capabilities

A high priority / high payoff is developing advanced BMD technologies that can be integrated into the BMDS to adapt to future threat changes. The investment strategy for these technologies balances the need to address the most dangerous current threats with the need to position the U.S. to respond to threat developments in the future. Areas for technology investment include: persistent discrimination in the current and future BMDS sensor architecture, high power laser scaling for Boost Phase Intercept (BPI), Multi Object Kill Vehicle technology and other advanced technology for high-risk/high-pay off breakthroughs. The advanced technology investments are informed by capability gap assessments and focus on concepts that bring upgraded capability to the warfighter. The goal is to provide transformative capabilities that enable the future BMDS to keep pace with new and evolving threats.

- **Hypersonic Defense (PE 0604181C).** MDA is requesting \$120.4 million in FY 2019. MDA will execute a rigorous systems engineering process, identify and mature full kill chain technology, provide analysis and assessment of target of opportunity events, and execute near term sensor and command and control capability upgrades to address defense from hypersonic threats. This effort will execute the Defense Science Board’s recommendations to develop and deliver a set of material solutions to address and defeat hypersonic threats informed by a set of near-term technology demonstrations. An integrated set of enhancements will provide incremental capability measured by progress and knowledge points in the following areas: establishment of systems engineering needs and requirements to identify alternative material solutions; execution of a series of sensor technology demonstrations; modification of existing BMDS sensors and the C2BMC element for hypersonic threats; and definition of weapon concepts and investments in key technologies to enable a broad set of solutions, including kinetic and non-kinetic means across left and right of launch.
- **Technology Maturation Initiatives (PE 0604115C).** MDA requests \$148.8 million to build on the foundational successes in Weapons Technology and Discrimination Sensor Technology. MDA will integrate an advanced sensor into the tactically proven Multispectral Targeting System and MQ-9 combination to address precision track and discrimination performance of this technology with the goal of eventually migrating to a space sensor layer. MDA’s plan is to continue the design to begin fabrication of a UAV-borne laser to address boost phase missile defense risks. Scalable, efficient, and compact high-energy lasers can be game –changing capabilities within missile defense architectures.

- **Common Kill Vehicle Technology Program (PE 0603294C).** MDA requests \$189.8 million to establish the technology foundation for killing multiple lethal objects from a single interceptor. MDA is on contract with three major primes for a three year, competitive program to reduce the technical risk for MOKV product development.
- **Advanced Research Program (PE 0603180C).** MDA requests \$20.4 million to conduct innovative research and development with small businesses, universities, and international partners to create and advance future missile defense capability. MDA continues to capitalize on the creativity and innovation of the nation’s small business community and academia to enhance the BMDS.
- **Advanced Concepts & Performance Assessment (PE 0603176C).** MDA also requests \$13.0 million for Advanced Concepts & Performance Assessment efforts, which develops advanced technology concept modeling, simulation, and performance analysis and delivers independent assessments of government, university, and industry technology concepts that, along with systems engineering requirements, support acquisition strategy decisions and define our technology focus areas. The request will fund the digital simulation and hardware-in-the-loop infrastructure required for testing of an airborne advanced sensor, Kill Vehicle Modular Open Architecture testbed, pre- and post-mission performance predictions and assessments, and mature related tracking, discrimination, and sensor fusion algorithms.

IV. Space

- **BMD Space Program (PE 1206895C).** MDA is requesting \$16.5 million in FY 2019. This request funds the Space-based Kill Assessment (SKA) experiment, which will use a network of high sample rate, infrared sensors to deliver a kill assessment capability to the BMDS tailored for homeland defense. This request supports SKA integration into the BMDS, SKA participation in MDA test events and the development of kill assessment algorithms required to add SKA to the operational BMDS. The full SKA network is currently planned to be on orbit in FY 2018. This request also supports development of kill assessment algorithms required to add SKA to the operational BMDS.
- **Space Tracking and Surveillance System (STSS) (PE 1206893C).** MDA is requesting \$37.0 million in FY 2019 for satellite operations and sustainment. The satellites which were launched in 2007, have far exceeded their life expectancy and have proven to be a very good investment. STSS consists of two satellites operating in Low Earth Orbit and provides risk reduction data for a potential operational BMDS tracking and surveillance constellation in the areas of sensor management, target signatures, discrimination, and fire control loop closure. STSS will continue participating in MDA test events and data collections providing battlespace awareness, technical intelligence, and space situational awareness to the Warfighter. This request also funds the Missile Defense Space Center (MDSC), which provides a collaborative environment to exploit and integrate STSS and other national security space assets for ballistic missile defense. The STSS program and the MDSC are also supporting concept development activities for future space sensor architecture studies and analyses to address advanced threats.

V. Other Program Highlights

- **Command and Control, Battle Management and Communication (C2BMC) (PE 0603896C).** MDA is requesting \$475.2 million in FY 2019 for C2BMC. C2BMC provides persistent acquisition, tracking, cueing, discrimination, and fire-control quality data to Aegis BMD, GMD, THAAD, Patriot, and coalition partners to support homeland and regional defense. During a recent flight test, C2BMC demonstrated EPAA Phase 3 engage-on-remote capability by integrating overhead sensors, AN/TPY-2 and Aegis BMD within the regional communications architecture. We continue to support Warfighter command, control and battle management needs across the globe by providing the Combatant Commander with the BMD planner, situational awareness tools, and battle management capability to support global BMD situational awareness, coalition operations, weapons release authority for homeland defense, and control and tasking of forward-based AN/TPY-2 radars. C2BMC operators and maintainers deploy forward in some of the world's hottest threat spots and continue to provide around-the-clock support to the local commanders. In FY 2019, we will complete testing and deployment of C2BMC Spiral 8.2-3 and BMDS Overhead Persistent Infra-Red Architecture (BOA) 6.1, in support of EPAA Phase 3 / Aegis BMD Engage-on-Remote functionality. Initial deployments will be to CENTCOM / EUCOM followed by NORTHCOM / PACOM providing enhanced tracking capabilities to the warfighter. MDA will also initiate integration of a sea-based mobile sensor in the Spiral 8.2-3 timeframe that will provide enhanced tracking for emerging threats. We will continue development of C2BMC Spiral 8.2-5, which provides increased system level discrimination data, BOA 7.0, to provide advance threat warning capability, threat characterization solutions and support command & control integration of the LRDR into the BMDS by 2021 to support a robust homeland defense capability. C2BMC will initiate Increment 7 development tasks for Robust Post Intercept Assessment supporting our regional defense focus. Finally, we continue supporting incremental

improvements to the BMDS to keep pace with emerging threats worldwide by investing in the development, integration and testing of advanced algorithms to improve track and discrimination capabilities and enhance the use of space based sensor data from sources such as the Space Based Infra-Red System (SBIRS), using the BMDS OPIR architecture. C2BMC will update hardware/software to increase Cybersecurity through implementation of the DoD Cybersecurity Discipline Implementation Plan - Four Lines of Effort conducting over 63 cyber-focused tests and assessments involving multiple agencies over the FYDP to ensure the system is cyber-secure.

- **MDA Engineering (PE 0603890C, Budget Projects MD24 and MD31).** MDA is requesting \$260.1 million in FY 2019 to perform the systems engineering required to design, build, test, assess, field and sustain the integrated BMDS. MDA Engineering defines BMDS architectures and functional requirements for integrated BMDS capabilities to defeat the evolving threats, analyzes architecture alternatives to address future threats, enables interoperability between U.S. forces and international partners, and drives future capability development from a system perspective to maximize the effectiveness of BMD technologies. MDA Engineering also performs pre- and post-mission analysis for BMD system tests, and assesses BMDS performance in order to deliver capabilities to the Warfighter. In FY 2019, MDA will conduct the engineering and technical assessment that underpins the EPAA Phase 3 Technical Capability Declaration (TCD). The TCD will provide confidence to the Warfighter that the Aegis Ashore site in Poland will operate as designed. MDA employs system and element-level models and simulations to verify BMDS performance and assess BMDS capability to engage and defeat complex threats across a spectrum of scenarios that cannot be demonstrated in flight tests. As a result, MDA is able to deliver to the Warfighter evolving, integrated, and layered BMDS

performance and capabilities that have been thoroughly assessed and validated through testing and modeling and simulation. In this budget cycle, MDA is pursuing improvements to both system-level digital simulation and integrated system-level ground test simulations.

- **BMD Sensors (PE 0603884C).** MDA is requesting \$220.9 million in FY 2019 to develop advanced discrimination algorithms for the AN/TPY-2 and SBX to counter evolving threats, and the implementation of object classification updates for COBRA DANE and UEWR. The discrimination improvement efforts will develop and field integrated Element capabilities to improve the ability of the BMDS to discriminate between lethal and non-lethal objects. In FY 2019, MDA supports the development of future radar capabilities through system engineering, software development, and testing support. MDA continues to support M&S efforts that include enhanced sensor models, integration of digital simulations into the BMDS M&S architecture, verification, validation, and accreditation of radar models, and interoperability between hardware and simulation models to reduce test costs. MDA requests \$81.0 million in FY 2019, for sensors testing activities (PE 0604879C). This request also provides planning, analysis, and execution of BMDS flight and ground tests identified in the IMTP and encompassing pre-test efforts, such as digital and Hardware-in-the-Loop (HWIL) pre-mission tests, and post-test efforts such as post-flight reconstruction.
- **BMD Radars Program Operations and Maintenance.** O&M supports both homeland and regional defense missions. MDA is requesting \$176.1 million in FY 2019 to sustain COBRA DANE, the Upgraded Early Warning Radars (UEWR), and the AN/TPY-2 radars. The services and combatant commands, with logistical support from MDA, operate AN/TPY-2 (Forward Based Mode) radars in Japan (two radars), Israel, Turkey, and United States Central Command (USCENTCOM) in support of regional defense.

MDA continues to support the AN/TPY-2 radar (Terminal Mode) as part of a forward deployed THAAD batteries in Guam and South Korea.

- **Integrated Master Test Plan (IMTP).** MDA, in conjunction with IMTP stakeholders, plans and executes a fully integrated test program that synchronizes the system under test with the warfighters trained to operate the system under varying wartime conditions against current and emerging threats. For flight testing, the agency incorporates the nine operational realism criteria defined by the Ballistic Missile Defense System Response to National Defense Authorization Act Section 234, for Fiscal Year 2005, Increasing Operational Realism. Forty of the sixty-six flight tests in the BMDS Test Program are currently planned to achieve these criteria. For system-level ground testing, all tests culminate in operational testing with warfighters on console and independent operational assessments by the BMDS Operational Test Agency Team. This ensures that BMDS capabilities are credibly demonstrated and validated prior to delivery to the Warfighter. MDA works collaboratively with the Director, Operational Test & Evaluation; Deputy Assistant Secretary of Defense, Developmental Test and Evaluation; Commander, Joint Functional Component Command for Integrated Missile Defense; Service Operational Test Agencies and the Joint Interoperability Test Command to identify and incorporate all testing requirements into development of the IMTP, a comprehensive, highly integrated, complex, cost-effective series of flight tests, ground tests, wargames, and exercises.

This budget continues MDA's longstanding support of U.S.-Israeli Cooperative BMD programs, to include the co-development of the David's Sling Weapon System, Upper Tier Interceptor, and Arrow Weapon System Improvements. MDA works with the Israeli Missile

Defense Organization on these programs in accordance with jointly signed international agreements. MDA is requesting a total of \$500 million in support of U.S.-Israeli programs.

VI. Summary

MDA requests \$9.9 billion in FY 2019 to strengthen and expand defenses for our nation, deployed forces, allies, and international partners against all ranges of increasingly capable missiles threats.

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Missile Defense Agency
President's Budget (PB) 2019-2023
FY 2019- FY 2023 Appropriation Summary
R-1 Exhibit
(\$ Thousands)

Line Number	Program Element	Budget Project	Program	Budget Activity	FY17 Actual	FY18	FY19	FY20	FY21	FY22	FY23	FY19-23
185	0901598C		Management HQ - MDA	06	30,693	29,947	28,626	27,276	27,894	28,466	29,005	141,267
		MD38	Management Headquarters	06	30,693	29,947	28,626	27,276	27,894	28,466	29,005	141,267
			Budget Activity 06 Total	06	117,435	29,947	32,026	27,276	27,894	28,466	29,005	144,667
			RDT&E Total	06	6,201,226	6,798,211	6,777,299	6,868,483	6,878,585	6,815,356	6,665,022	34,004,745
MILCON												
	0603882C		MID-COURSE MILCON	NA	9,560	200,000	8,000	0	0	90,000	0	98,000
		MM08	Missile Defense Complex Switchgear Facility, Ft. Greely, AK	NA	9,560	200,000	8,000	0	0	90,000	0	98,000
	0603884C		SENSORS MILCON	NA	166,670	0	174,000	0	0	0	0	174,000
		MM04	Wake Island Air Base Test Support Facility, Wake Is	NA	11,670	0	0	0	0	0	0	0
		MM96	Long Range Discriminating Radar (LRDR)	NA	155,000	0	0	0	0	0	0	0
		MM11	Long Range Discrimination Radar Cmplx, Clear AFS, AK	NA	0	0	174,000	0	0	0	0	174,000
	0603888C		BMD TEST and TARG MILCON	NA	0	0	0	0	0	0	181,260	181,260
		MM44	BMDS Test Infrastructure Building (BTB)	NA	0	0	0	0	0	0	181,260	181,260
	0604673C		Pacific Discriminating Radar	NA	0	0	0	0	138,000	548,965	0	686,965
		MM51	Homeland Defense Radar - Pacific (HDR-P)	NA	0	0	0	0	0	365,965	0	365,965
		MM41	Homeland Defense Radar - Hawaii (HDR-H)	NA	0	0	0	0	138,000	183,000	0	321,000
	22299902		MINOR MILCON	NA	2,414	3,000	10,000	2,729	1,616	501	1,363	16,209
		MM14	Minor MILCON	NA	2,414	3,000	10,000	2,729	1,616	501	1,363	16,209
	31299903		MILCON PLANNING and DESIGN	NA	15,000	0	14,184	49,482	38,424	8,009	8,160	118,259
		MM32	MILCON Planning Design	NA	15,000	0	14,184	49,482	38,424	8,009	8,160	118,259
			Budget Activity 00 Total	NA	193,644	203,000	206,184	52,211	178,040	647,475	190,783	1,274,693
			MILCON Total	NA	193,644	203,000	206,184	52,211	178,040	647,475	190,783	1,274,693
			Program Total		8,489,825	9,922,773	9,915,304	9,368,450	9,261,860	9,283,378	8,909,999	46,738,991

Missile Defense Agency Congressional Reporting Requirements

Reporting Requirement Reference	Reporting Requirement Language	Budget Documentation
<p>Sec 1690 of the FY18 National Defense Authorization Act (H.R. 2810), pp. 2638-2639</p>	<p>SEC. 1690. SENSE OF CONGRESS AND REPORT ON GROUND-BASED MIDCOURSE DEFENSE TESTING.</p> <p>(a) SENSE OF CONGRESS.—It is the sense of Congress that—</p> <p>(1) at a minimum, the Missile Defense Agency should continue to flight test the ground-based midcourse defense element at least once each fiscal year;</p> <p>(2) the Department of Defense should allocate increased funding to homeland missile defense testing to ensure that the defenses of the United States continue to evolve faster than the threats against which they are postured to defend, while pursuing a sound acquisition practice;</p> <p>(3) in order to rapidly innovate, develop, and field new technologies, the Director of the Missile Defense Agency should continue to focus testing campaigns on delivering increased capabilities to the Armed Forces as quickly as possible; and</p> <p>(4) the Director should seek to establish a more prudent balance between risk mitigation and the more rapid testing pace needed to quickly develop and deliver new capabilities to the Armed Forces.</p> <p>(b) REPORT.—</p> <p>(1) IN GENERAL.—If consistent with the direction or recommendations of the Ballistic Missile Defense Review that commenced in 2017, not later than 90 days after the date on which the Review is published, the Director of the Missile Defense Agency shall submit to the congressional defense committees a revised missile defense testing campaign plan that accelerates the development and deployment of new missile defense technologies.</p> <p>(2) CONTENTS.—The report under paragraph (1) shall include the following:</p> <p>(A) A detailed analysis of the acceleration of each of following programs:</p> <p>(i) Redesigned kill vehicle.</p> <p>(ii) Multi-object kill vehicle.</p> <p>(iii) Configuration-3 Booster.</p> <p>(iv) Such additional technologies as the Director considers appropriate.</p> <p>(B) A new deployment timeline for each of the programs listed in subparagraph (A) or a detailed description of why the current timeline for deployment technologies under those programs is most suitable.</p> <p>(C) An identification of any funding or policy restrictions that would slow down the deployment of the technologies under the programs listed in subparagraph (A).</p>	<p>Submitted with the FY2019 Budget Release</p>

Missile Defense Agency Congressional Reporting Requirements

	<p>(D) A risk assessment of the potential cost-overruns and deployment delays that may be encountered in the expedited development process of the capabilities under paragraph (1).</p> <p>(c) REPORT ON FUNDING PROFILE.—The Director shall include with the budget justification materials submitted to Congress in support of the budget of the Department of Defense for fiscal year 2019.</p>	
<p>Sec. 1696 of the FY17 National Defense Authorization Act (S 2943), pp. 2638-2639</p>	<p>SEC. 1696. REPORTS ON UNFUNDED PRIORITIES OF THE MISSILE DEFENSE AGENCY</p> <p>(a) REPORTS.—Not later than 10 days after the date on which the budget of the President for each of fiscal years 2018 and 2019 is submitted to Congress pursuant to section 1105 of title 31, United States Code, the Director of the Missile Defense Agency shall submit to the Secretary of Defense and the Chairman of the Joint Chiefs of Staff, and to the congressional defense committees,</p> <p>a report on the unfunded priorities of the Missile Defense Agency.</p> <p>(b) ELEMENTS.—</p> <p>(1) IN GENERAL.—Each report under subsection (a) shall specify, for each unfunded priority covered by such report, the following:</p> <p>(A) A summary description of such priority, including the objectives to be achieved if such priority is funded (whether in whole or in part).</p> <p>(B) The additional amount of funds recommended in connection with the objectives under subparagraph (A).</p> <p>(C) Account information with respect to such priority, including the following (as applicable):</p> <p>(i) Line Item Number (LIN) for applicable procurement accounts.</p> <p>(ii) Program Element (PE) number for applicable research, development, test, and evaluation accounts.</p> <p>(iii) Sub-activity group (SAG) for applicable operation and maintenance accounts.</p> <p>(2) PRIORITIZATION OF PRIORITIES.—Each report under subsection (a) shall present the unfunded priorities covered by such report in order of urgency of priority.</p> <p>(c) UNFUNDED PRIORITY DEFINED.—In this section, the term “unfunded priority”, in the case of a fiscal year, means a program, activity, or mission requirement of the Missile Defense Agency that—</p> <p>(1) is not funded in the budget of the President for the fiscal year as submitted to Congress pursuant to section 1105 of title 31, United States Code;</p> <p>(2) is necessary to fulfill a requirement associated with an operational or contingency plan of a combatant command or other validated requirement; and</p> <p>(3) would have been recommended for funding through the budget referred to in paragraph (1) by</p>	<p>Submitted no later than 10 days after PB18 and PB19 submissions</p>

Missile Defense Agency Congressional Reporting Requirements

	<p>the Director of the Missile Defense Agency in connection with the budget if— (A) additional resources had been available for the budget to fund the program, activity, or mission requirement; or (B) the program, activity, or mission requirement has emerged since the budget was formulated.</p>	
<p>Sec. 1684 of the FY16 National Defense Authorization Act (HR 1735), pp. 1056-1059</p>	<p>SEC. 1684. ADDITIONAL MISSILE DEFENSE SENSOR COVERAGE FOR PROTECTION OF UNITED STATES HOMELAND</p> <p>(a) It is the sense of Congress that additional missile defense sensor discrimination capabilities are needed to enhance the protection of the United States homeland against potential long-range ballistic missiles from Iran that, according to the Department of Defense, could soon be obtained by Iran as a result of its active space launch program.</p> <p>(b) STUDIES AND EVALUATIONS ON HOMEPORT OF SEA-BASED X-BAND RADAR.— Not later than 60 days after the date of the enactment of this Act, the Director of the Missile Defense Agency shall commence any siting studies, environmental impact assessments or statements required pursuant to the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) that have not otherwise been prepared, homeport agreements for sea-based X-band radar support, evaluations of any needed pier modifications, and evaluations of any communications capabilities or other requirements to carry out the reassignment of the homeport of the sea-based X-band radar to a homeport on the East Coast of the United States.</p> <p>(c) POTENTIAL FUTURE MISSILE DEFENSE SENSOR SITES.— (1) EVALUATION.—Not later than March 31, 2016, the Director shall commence a study to evaluate at least three possible additional locations (in or outside the United States), selected by the Director, that would be best suited for future deployment of an advanced missile defense sensor site optimized against threats from Iran. (2) ENVIRONMENTAL IMPACT STATEMENTS.— Except as provided by paragraph (3), the evaluation under paragraph (1) shall include an environmental impact statement or other analysis in accordance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) for each location included in the evaluation. (3) EXCEPTION.—If an environmental impact statement or other analysis described in paragraph (2) has already been prepared, or is not required by law, for a location included in the evaluation under paragraph (1), the Director shall not be required to carry out paragraph (2) with respect to such location.</p> <p>(d) DEPLOYMENT OF ADDITIONAL COVERAGE.— (1) DEPLOYMENT.—Not later than</p>	<p>Submitted in the FY2017 Budget Justification Materials in PE 0603890C (BMD Enabling Programs) and PE 0603884C (BMD Sensors)</p>

Missile Defense Agency Congressional Reporting Requirements

	<p>December 31, 2020, the Director, in cooperation with the relevant combatant command, shall deploy a long-range discrimination radar or other appropriate sensor capability in a location optimized to support the defense of the homeland of the United States from emerging long-range ballistic missile threats from Iran.</p> <p>(2) SEA-BASED X-BAND RADAR.—If the Director carries out paragraph (1) by reassigning the homeport of the sea-based X-band radar, the Director and the Secretary of the Navy may not carry out such reassignment until the date on which the Director certifies to the congressional defense committees that Hawaii will have adequate missile defense coverage prior to such reassignment.</p> <p>(e) SUBMISSION OF INFORMATION.—</p> <p>(1) REPORT.—Not later than December 31, 2018, the Director shall submit to the congressional defense committees a report containing the following:</p> <p>(A) The findings of the study conducted under paragraph (1) of subsection (c), including any environmental impact statements or analyses required by paragraph (2) of such subsection.</p> <p>(B) Notification of the manner in which Hawaii is being provided ballistic missile defense coverage.</p> <p>(2) PLAN.—In the budget justification materials submitted to Congress in support of the budget for each of fiscal years 2017 through 2020 submitted by the President to Congress under section 1105 of title 31, United States Code, the Director shall include—</p> <p>(A) the plan of the Director to carry out subsection (d); and</p> <p>(B) an update on the progress of the Director in implementing subsections (b) and (c).</p>	
<p>Sec 231 of the FY14 National Defense Authorization Act (HR 3304, TITLE II – Subtitle C), pp. 18</p>	<p>SEC 231. IMPROVEMENTS TO ACQUISITION ACCOUNTABILITY REPORTS ON BALLISTIC MISSILE DEFENSE SYSTEM</p> <p>(a) Improvement to Operations and Sustainment Cost Estimates- In preparing the acquisition accountability reports on the ballistic missile defense system required by section 225 of title 10, United States Code, the Director of the Missile Defense Agency shall improve the quality of cost estimates relating to operations and sustainment that are included in such reports under subsection (b)(3)(A) of such section, including with respect to the confidence levels of such cost estimates.</p> <p>(b) Operations and Sustainment Responsibility- Section 225 of title 10, United States Code, is amended by adding at the end the following new subsection:</p> <p>(e) Operations and Sustainment Cost Estimates- The Director shall ensure that each life-cycle cost estimate included in an acquisition baseline pursuant to subsection (b)(3)(A) includes--</p> <p>(1) all of the operations and sustainment costs for which the Director is responsible; and</p> <p>(2) a description of the operations and sustainment functions and costs for which a military department is responsible.'</p>	<p>MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR fully satisfies the requirement.</p>

Missile Defense Agency Congressional Reporting Requirements

	<p>(c) Report-</p> <p>(1) IN GENERAL- Not later than one year after the date of the enactment of this Act, the Director of the Missile Defense Agency shall submit to the congressional defense committees a report outlining the plans of the Director to improve the quality of cost estimates pursuant to subsection (a).</p> <p>(2) ELEMENTS- The report under paragraph (1) shall include--</p> <p>(A) a description of the actions planned to improve the quality of cost estimates included in the acquisition accountability reports on the ballistic missile defense system required by section 225 of title 10, United States Code;</p> <p>(B) the schedule for such planned actions, including the planned schedule for meeting the requirements of subsection (e) of such section 225, as added by subsection (b);</p> <p>(C) a description of any steps taken during the previous year to improve the quality of such cost estimates;</p> <p>(D) an assessment of how the planned improvements compare to the best practices and cost-estimation guidelines recommended by the Comptroller General of the United States for cost estimates of the ballistic missile defense system;</p> <p>(E) any other matters the Director considers appropriate; and</p> <p>(F) the views of the Comptroller General of the United States with respect to the contents of the report.</p> <p>(3) FORM- The report under paragraph (1) shall be submitted in unclassified form.</p>	
<p>Sec 234 of H.R. 1960 H. Rpt 113-02, FY14 House Armed Services Committee Report, pp. 67-68</p>	<p>REPORT ON IMPROVEMENTS TO ACQUISITION ACCOUNTABILITY REPORTS ON BALLISTIC MISSILE DEFENSE SYSTEM</p> <p>This section would amend section 225 of title 10, United States Code, to include a requirement that the Director, Missile Defense Agency include in the annual Ballistic Missile Defense System Accountability Report certain operation and support costs, and statements as to the quality estimate level of each cost estimate as well as the steps the Director will take to ensure these estimates reach the “high-quality estimate” level established by the Comptroller General of the United States.</p> <p>(a) In General.—Section 225 of title 10, United States Code, is amended—</p> <p>(1) in subsection (b)(3)(A), by inserting “comprehensive” before “life-cycle”; and</p> <p>(2) by adding at the end the following:</p> <p>(e) Quality of Cost Estimates.—(1) The Director shall ensure that each cost estimate included in an acquisition baseline pursuant to subsection (b)(3) includes all operation and support costs, regardless of funding source, for which the Director is responsible.</p> <p>(2) In each such baseline submitted to the congressional defense committees, the Director shall</p>	<p>MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR fully satisfies the requirement.</p>

Missile Defense Agency Congressional Reporting Requirements

	<p>state whether the underlying cost estimates in such baseline meet the criteria of the Comptroller General of the United States to be considered a high-quality estimate. If the Director states that such estimates do not meet such criteria, the Director shall include in such baseline the actions, including a schedule, that the Director plans to carry out for the estimates to meet such criteria.”</p>	
<p>Sec 231 of the FY12 National Defense Authorization Act (S 1867, TITLE II – Subtitle C), pp. 53-54</p>	<p>SEC. 231. ACQUISITION ACCOUNTABILITY REPORTS ON THE BALLISTIC MISSILE DEFENSE SYSTEM</p> <p>(a) BASELINE REQUIRED.—</p> <p>(1) IN GENERAL.—Chapter 9 of title 10, United States Code, is amended by inserting after section 224 the following new section: 225. Acquisition accountability reports on the ballistic missile defense system</p> <p>(a) BASELINES REQUIRED.—(1) In accordance with paragraph (2), the Director of the Missile Defense Agency shall establish and maintain an acquisition baseline for—</p> <p>(A) each program element of the ballistic missile defense system, as specified in section 223 of this title; and</p> <p>(B) each designated major subprogram of such program elements.</p> <p>(2) The Director shall establish an acquisition baseline required by paragraph (1) before the date on which the program element or major subprogram enters—</p> <p>(A) engineering and manufacturing development; and</p> <p>(B) production and deployment.</p> <p>(3) Except as provided by subsection (d), the Director may not adjust or revise an acquisition baseline established under this section.</p> <p>(b) ELEMENTS OF BASELINES.—Each acquisition baseline required by subsection (a) for a program element or major subprogram shall include the following:</p> <p>(1) A comprehensive schedule, including—</p> <p>(A) research and development milestones;</p> <p>(B) acquisition milestones, including design reviews and key decision points;</p> <p>(C) key test events, including ground and flight tests and ballistic missile defense system tests;</p> <p>(D) delivery and fielding schedules;</p> <p>(E) quantities of assets planned for acquisition and delivery in total and by fiscal year; and</p> <p>(F) Planned contract award dates.</p> <p>(2) A detailed technical description of—</p> <p>(A) the capability to be developed, including hardware and software;</p> <p>(B) system requirements, including performance requirements;</p> <p>(C) how the proposed capability satisfies a capability identified by the commanders of the</p>	<p>MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR fully satisfies the requirement.</p>

Missile Defense Agency Congressional Reporting Requirements

- combatant commands on a prioritized capabilities list;
- (D) key knowledge points that must be achieved to permit continuation of the program and to inform production and deployment decisions; and
- (E) how the Director plans to improve the capability over time.
- (3) A cost estimate, including—
- (A) a life-cycle cost estimate that separately identifies the costs regarding research and development, procurement, military construction, operations and sustainment, and disposal;
 - (B) program acquisition unit costs for the program element;
 - (C) average procurement unit costs and program acquisition costs for the program element; and
 - (D) an identification of when the document regarding the program joint cost analysis requirements description is scheduled to be approved.
- (4) A test baseline summarizing the comprehensive test program for the program element or major subprogram outlined in the integrated master test plan.
- (c) ANNUAL REPORTS ON ACQUISITION BASELINES.—
- (1) Not later than February 15 of each year, the Director shall submit to the congressional defense committees a report on the acquisition baselines required by subsection (a).
- (2)(A) The first report under paragraph (1) shall set forth each acquisition baseline required by subsection (a) for a program element or major subprogram.
- (3) Each subsequent report under paragraph (1) shall include—
- (i) any new acquisition baselines required by subsection (a) for a program element or major subprogram; and
 - (ii) with respect to an acquisition baseline that was previously included in a report under paragraph (1), an identification of any changes or variances made to the elements described in subsection (b) for such acquisition baseline, as compared to—
- (I) the initial acquisition baseline for such program element or major subprogram; and
 - (II) the acquisition baseline for such program element or major subprogram that was submitted in the report during the previous year.
- (3) Each report under this subsection shall be submitted in unclassified form, but may include a classified annex.
- (d) EXCEPTION TO LIMITATION ON REVISION.—The Director may adjust or revise an acquisition baseline established under this section if the Director submits to the congressional defense committees notification of—
- (1) a justification for such adjustment or revision;
 - (2) the specific adjustments or revisions made to the acquisition baseline, including to the elements described in subsection (b); and

Missile Defense Agency Congressional Reporting Requirements

	<p>(3) the effective date of the adjusted or revised acquisition baseline.”.</p> <p>(2) CLERICAL AMENDMENT.—The table of sections at the beginning of such chapter is amended by adding at the end the following new item: section 225. Acquisition accountability reports on the ballistic missile defense system.”.</p> <p>(b) CONFORMING AMENDMENTS.—</p> <p>(1) FISCAL YEAR 2011 NDAA.—Section 225 of the Ike Skelton National Defense Authorization Act for Fiscal Year 2011 (Public Law 111–383; 124 Stat. 4170; 10 U.S.C. 223 note) is repealed.</p> <p>(2) FISCAL YEAR 2008 NDAA.—Section 223 of the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110–181; 122 Stat. 39; 10 U.S.C. 223 note) is amended by striking subsection (g).</p> <p>(3) FISCAL YEAR 2003 NDAA.—Section 221 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (Public Law 107–314; 116 Stat. 2484; 10 U.S.C. 2431 note) is repealed.</p>	
<p>FY12 National Defense Authorization Act, Report Language – House Report 112-239 (Subtitle C Missile Defense Matters), pp. 43-44</p>	<p>SEC. 232. COMPTROLLER GENERAL REVIEW AND ASSESSMENT OF MISSILE DEFENSE ACQUISITION PROGRAMS</p> <p>(a) Comptroller General Assessment—</p> <p>(1) IN GENERAL- The Comptroller General of the United States shall review the annual reports submitted under section 225(c) of title 10, United States Code, as added by section 231 of this Act, that cover any of fiscal years 2012 through 2015 and assess the extent to which the Missile Defense Agency has achieved its acquisition goals and objectives.</p> <p>(2) REPORTS- Not later than March 15, 2013, and each year thereafter through 2016, the Comptroller General shall submit to the congressional defense committees a report on the assessment under paragraph (1) with respect to the acquisition baselines for the preceding fiscal year. Each report shall include any findings and recommendations on missile defense acquisition programs and accountability therefore that the Comptroller General considers appropriate.</p> <p>(b) Annual Reports on Missile Defense Executive Board Activities- In each of the first three reports submitted under section 225(c) of title 10, United States Code, as added by section 231 of this Act, the Director shall include a description of the activities of the Missile Defense Executive Board during the fiscal year preceding the date of the report, including the following:</p> <p>(1) A list of each meeting of the Board during such year.</p> <p>(2) The agenda and issues considered at each such meeting.</p> <p>(3) A description of any decisions or recommendations made by the Board at each such meeting.</p> <p>(c) Repeal of Superseded Reporting Authority- Section 232 of the National Defense Authorization</p>	<p>MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR fully satisfies the requirement.</p>

Missile Defense Agency Congressional Reporting Requirements		
	Act for Fiscal Year 2002 (Public Law 107-107; 115 Stat. 1037; 10 U.S.C. 2431 note) is amended by striking subsection (g).	
Sec. 1688 of the FY16 National Defense Authorization Act (HR 1735), pp. 1065	SEC. 1688. EXTENSION OF REQUIREMENT FOR COMPTROLLER GENERAL OF THE UNITED STATES REVIEW AND ASSESSMENT OF MISSILE DEFENSE ACQUISITION PROGRAMS Section 232(a) of the National Defense Authorization Act for Fiscal Year 2012 (Public Law 112–81; 125 Stat. 1339) is amended— (1) in paragraph (1), by striking “through 2015” and inserting “through 2020”; and (2) in paragraph (2), in the first sentence, by striking “through 2016” and inserting “ through 2021 ”.	MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR fully satisfies the requirement.
<i>Sec 223(a). Ballistic Missile Defense Programs: Procurement;</i> National Defense Authorization Act for Fiscal Year 2004 (H.R. 1588, H. Rpt. 108-354), pp. 30-31	BUDGET JUSTIFICATION MATERIALS In the budget justification materials submitted to Congress in support of the Department of Defense budget for any fiscal year (as submitted with the budget of the President under section 1105(a) of title 31), the Secretary of Defense shall specify, for each ballistic missile defense system element for which the Missile Defense Agency is engaged in planning for production and initial fielding, the following information: (1) The production rate capabilities of the production facilities planned to be used for production of that element. (2) The potential date of availability of that element for initial fielding. (3) The estimated date on which the administration of the acquisition of that element is to be transferred from the Director of the Missile Defense Agency to the Secretary of a military department.	MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR partially satisfies the requirement through its schedule baseline. Exhibit P-21 – Budget Production Schedule Procurement -MDA 0208866C , Terminal Defense, 0208866C , Aegis BMD, 0208866C , Aegis Ashore Phase III 0208866C , BMDS AN/TPY-2 Radars 0208866C , Iron Dome 0208866C , BMD Midcourse

Missile Defense Agency Congressional Reporting Requirements

		<p>0208866C, THAAD Procurement</p> <p>0208866C, Short-Range Ballistic Missile Defense</p>
<p><i>Sec 223(b). Ballistic Missile Defense Programs: Procurement; National Defense Authorization Act for Fiscal Year 2004 (H.R. 1588, H. Rpt. 108-354, pp. 30-31)</i></p>	<p>FUTURE-YEARS DEFENSE PROGRAM</p> <p>The Secretary of Defense shall include in the future-years defense program submitted to Congress each year under section 221 of this title an estimate of the amount necessary for procurement for each ballistic missile defense system element, together with a discussion of the underlying factors and reasoning justifying the estimate.</p>	<p>Procurement -MDA</p> <p>0208866C, Terminal Defense,</p> <p>0208866C, Aegis BMD,</p> <p>0208866C, Aegis Ashore Phase III</p> <p>0208866C, BMDS AN/TPY-2 Radars</p> <p>0208866C, Iron Dome</p>

Missile Defense Agency
Fiscal Year (FY) 2019 Budget Estimate Submission

ACRONYMS AND ABBREVIATIONS

A	
A&AS	Advisory and Assistance Services
AAEA	Aegis Ashore Engineering Agent
AAFTM	Aegis Ashore Flight Test Mission
AAMDS	Aegis Ashore Missile Defense System
AAMDSC	Aegis Ashore Missile Defense System Complex
AAMDTC	Aegis Ashore Missile Defense Test Complex
AAW	Anti-Air Warfare
ABEWS	Airborne Early Warning System
ABIR	Airborne Infrared Radar
ABMD	Aegis Ballistic Missile Defense
ABS	Airborne Sensors; American Bureau of Shipping
ABWO	Assistant Ballistic Missile Defense Watch Officer
ACB	Advanced Capability Build
ACB 12	Advanced Capability Build 12
ACD	Adversary Capability Document
ACD&P	Advanced Component Development & Prototypes
ACL	Achievable Capabilities List
ACS	Aegis Combat System
ADP	Arrow Deployability Program; Automated Data Processing; Adversary Delta Package
AEDC	Arnold Engineering Development Center
AEI	Annual Integration Events
AEP	Analysis Execution Plans
AEU	Antenna Equipment Unit
AFB	Air Force Base
AFS	Avionics Flight Software
AI&T	Assembly, Integration and Test
AIE	Annual Integration Event
ALO	Aegis Light-Off
ALTB	Active Layered Theater Ballistic
AMCOM	Army Aviation and Missile Command
AMDR	Air and Missile Defense Radar
AMDWS	Air and Missile Defense Workstation
AMOD	Aegis Modernization (program)
AMRDEC	Aviation and Missile Research, Development and Engineering Center
AN/SPY-1	Joint Army-Navy equipment nomenclature: S -Water (surface ship), P - Radar, Y - Surveillance (target detecting and tracking) and Control (fire control and/or air control), 1 - model number [AN/SPY-1 is an equipment nomenclature, not an Acronym]
AN/TPY	Army Navy/Transportable Radar Surveillance
AN/TPY-2	Joint Army-Navy equipment nomenclature: T - Transportable (ground), P - Radar, Y - Surveillance (target detecting and tracking) and Control (fire control and/or air control), 2 - model number [AN/TPY-2 is an equipment nomenclature, not an Acronym]
AOA	Analyses of Alternatives
AOC	Air Operations Center
AOR	Area of Responsibility
APEX	Assessment Parameter Extraction
APL	Applied Physics Laboratory
APLITS	Approved Product List
ARAV	Aegis Readiness Assessment Vehicles
ARST	Advanced Remote Sensor Technology
ARSTRST	(US) Army Forces Strategic Command
ASIP	Arrow System Improvement Program; Application Specific Integrated Circuit
AT&L	Acquisition, Technology and Logistics
ATD	Advanced Technology Development; Assistant to the Director

ACRONYMS AND ABBREVIATIONS

ATEC	Army Test and Evaluation Command
ATK	Alliant Techsystems, Inc
AUR	All Up Round
AWS	Arrow Weapon System; AEGIS Weapon System
B	
BCA	Business Case Analysis; BMDS Capability Assessment
BCF	BCF Solutions, Incorporated
BCM	C2BMC model
BCN	BMDS Communications Network
BCSC-T	BMDS Communication System Complex Transportable
BDR	BMDS Discrepancy Reports
BER	Baseline Execution Reviews
BM	Battle Management; Ballistic Missile
BMD	Ballistic Missile Defense
BMDS	Ballistic Missile Defense System
BNOSC	BMDS Network Operations and Security Center
BOA	BMDS Overhead Non-imaging Infrared (ONIR) Architecture
BoD	Boards of Director
BORRS	BMDS Operational Readiness Reporting System
BOS	Base Operations Support
BSA	Budget Sub-Activity
BSC	Battery Support Center
BSO	BMDS Safety Officers
BSP	BMD Signal Processor
BTG	BCN Teleport Gateway
BWO	BMDS Watch Officers
C	
C&A	Certification and Accreditation
C&DSim	Command and Decision Simulation
C/FFP	Cost Fixed Firm Price
C2BMC	Command and Control, Battle Management, and Communications
C2P	Command and Control Processor
C4I	Command, Control, Communications, Computers and Intelligence
CAFM	Computer-aided Facilities Management
CARD	Cost Analysis and Requirements Document
CBAU	Consolidated Booster Avionics Upgrade
CCAS	Combat Capabilities Assessment Schedule
CCC	C2BMC Control Center
CCLS	Centralized Contractor Logistics Support
CCM	Counter Counter-Measures
CCMD	Combatant Commander
CD	Concept Descriptions; Cobra Dane
CDCS	Coherent Doppler Collection System
CDIN	C2BMC Deployable Interface Node
CDLMS	Common Data Link Monitoring System
CDR	Critical Design Review
CDU	Cobra Dane Upgrade
CE	Capability Enhanced
CEC	Critical Engagement Condition
CECOM	US Army Communications & Electronics Command
CENAU	Corps of Engineers European Division
CENTCOM	Central Command
CERT	Computer Emergency Response Team
CEU	Cooling Equipment Unit
CG	US Navy ship hull classification symbol for - Guided Missile Cruiser [CG is not an Acronym]

ACRONYMS AND ABBREVIATIONS

CIC	Counterintelligence in Cyberspace
CIDS	Critical Items Description Specifications
CIIA	Cyber, Identity, and Information Assurance
CIRT	Computer Incident Response Team
CLE	Command and Launch Equipment
CLS	Contractor Logistics Support
CND	Computer Network Defense
CNET	Classified Network
COCOM	Combatant Commanders
COMNET	communications network
COMSEC	Communication Security
CONOPS	Concept of Operations
CONPLAN	Concept Plan
CONPLANS	Contingency Plans
CONUS	Continental United States
COOP	Calibrated Orbiting Objects Program (COOP)
CoS	Colorado Springs
COTS	Commercial off the Shelf
CP	Computer Program
CPAF	Cost Plus Award Fee
CPCR	Computer Program Change Request
CPFF	Cost Plus Fixed Fee
CPIF	Cost-Plus-Incentive-Fee
CPRS	Computer Program Requirements Specifications
CR	Capability Release
CSC	Computer Sciences Corporation
CSCS	Center for Surface Combat Systems
CSEDS	Combat Systems Engineering Development Site
CSS	Contractor Support Services
CTM	Core Truth Models
CTTO	Concurrent Test, Training and Operations
CTV	Control Test Vehicle
CTV-01	Controlled Test Vehicle-01
CU	Capability Upgrade
CVT	Controls Validation Testing
CY	Calendar Year
D	
DAA	Designated Approving Authority
DAA	Defense Appropriations Act; Designated Approving Authority
DAC	Divert Attitude Control
DACS	Divert and Attitude Control System
DARPA	Defense Advanced Research Projects Agency
DASA	German Aerospace. Member of the MEADS Program Team.
DAU	Defense Acquisition University
DDCS	Digital Data Collection System
DDG	US Navy ship hull classification symbol for - Guided Missile Destroyer [DDG is not an Acronym]
DECC	Defense Enterprise Computing Center
DEERS	Defense Enrollment Eligibility Reporting System
DESH	MDA/DESH - Missile Defense Agency (MDA)/Modeling & Simulation Huntsville (DESH) [office symbol within MDA Engineering Directorate, not an Acronym]
DESIM	Discrete Event Simulation
DFAR	Defense Federal Acquisition Regulation
DHP	Data Handling Plan
DIA	Defense Intelligence Agency
DIACAP	DoD Information Assurance Certification and Accreditation Process; DoD Information Assurance Certification and Accreditation Program

ACRONYMS AND ABBREVIATIONS

DIACAP	DoD Information Assurance Certification and Accreditation Process
DISA	Defense Information Systems Agency
DMETS	Distributed, Multi-Echelon Training System
DMIC	Digital M&S Integration Center
DMS	Diminished Manufacturing Support
DoD	Department of Defense
DoDi	DoD Information Technology
DODIC	Department of Defense Identification Code
DOT&E	Director of Operational Test and Evaluation
DPALS	Diode Pumped Alkali Laser System
DPF	MDA Facilities, MILCON & Environmental Management Directorate
DREN	Defense Research Engineering Network
DRSN	Defense Red Switch Network
DSA	Digital Simulation Architecture
DSCS	Defense Satellite Communication System
DSWS	David's Sling Weapon System
DT&E	Developmental Test and Evaluation
DTIC	Digital Test and Integration Center
DTLOMS	Doctrine, Training, Leadership, Organization, Materiel, Soldier
DTRA	Defense Threat Reduction Agency
DW	Defense Wide
DWCF	Defense Working Capital Fund
E	
E/CCA	Element/Component Characteristics for Analysis
EA	Executing Agent; Engineering Assessment
EADSIM	Extended Air Defense Simulation
EAL	Evaluated Assurance Level
EAS	Eareckson Air Station
ECS	Element Capability Specification; Engineering Change Summary
EDP	Evolutionary Development Program
EECS	Event Execution Control System
EEU	Electronics Equipment Unit
EGP	Exceedance Generation Processing
EHF	Extremely High Frequency
EKV	Exoatmospheric Kill Vehicle
E-LRALT	Enhanced Long Range Air Launch Target
EMRLS	Engineering and Manufacturing Readiness Levels
eMass	Enterprise Mission Assurance Support Service
EMD	Engineering, Manufacturing, and Development
EMDR	Executive Mission Data Review
EME	Empirical Measurement Events
eMRBM	Extended Medium Range Ballistic Missile
EMRL	Engineering and Manufacturing Readiness Level
EO/IR	Electro-Optical/Infrared
EOC	Engagement Operations Center
EOIR	Engage-on-Remote
EPAA	European Phased Adaptive Approach
EQLB	Executive Quick Look Briefing
ESD	Enterprise System Directorate
ESI	External System Interface; Enterprise Software Initiative
ESL	External Sensors Lab
ESOH	Environmental, Safety and Occupational Health
ET	Embedded Test;
ETTETS	End to End Distributed Development System
EUCOM	European Command
EVMS	Earned Value Management System
EWR	Early Warning Radar

ACRONYMS AND ABBREVIATIONS

EWS	Enterprise Work Stations
F	
FCS	Fire Control Section; Fire Control System (SPY/FCS - AN/SPY radar Fire Control System)
FDE	Force Developers Evaluation
FFP	Firm Fixed Price
FFPLOE	Firm Fixed Prices Level of Effort
FFRDC	Federally Funded Research and Development Center
FISMA	Federal Information Security Management Act
FLITES	Fast Line-of Sight Imagery for Target and Exhaust Plume Signatures
FMA	Foreign Material Acquisition; Foreign Military Asset
FMS	Foreign Military Sales
FOCI	Foreign Ownership, Control, and Influence
FOIA	Freedom of Information Act
FPA	Focal Plane Array
FPAF	Fixed Price Award Fee
FPIF	Fixed Price Incentive Fee
FT	Flight Test
FTF	Flexibility Target Family
FTG	Flight Test GMD
FTM	Flight Test Mission
FTO-02	Flight Test Operational-02
FTT	Flight Test - THAAD
FY	Fiscal Year
FYDP	Future Years Defense Program
G	
GaAs	Gallium arsenide
GaN	Gallium Nitride
GBI	Ground Based Interceptor
GBR-P	Ground Based Radar Prototype
GCC	Geographic Combatant Commander
GCCS-M	Global Command and Control System - Maritime
GCN	Global Command Network; GMD Communications Network
GD	Global Deployment
GDDT	Government Directed Down Time
GEM	Global Engagement Manager; Guidance Enhancement Missiles (PATRIOT)
GENSER	General Services
GEOINT	Geospatial Intelligence
GEP	Ground Entry Point
GFC	GMD Fire Control
GFC / C	GMD Fire Control and Communications
GFE	Government Furnished Equipment
GFS	Government Furnished Services
GIG	Global Information Grid
GM	Ground-based Midcourse
GMD	Ground-based Midcourse Defense
GPS	Global Positioning System
GS	Ground Systems
GSOC	Global Security Operations Center
GT	Ground Test
GTD	Ground Test Distributed
GTI	Ground Test Integrated
GTRI	Georgia Tech Research Institute
GTX	Ground Test (Element to Element)
GWS	GEM Work Stations

ACRONYMS AND ABBREVIATIONS

H	
HAENS	High Altitude Exoatmospheric Nuclear Survivability
HEMP	High Altitude Electromagnetic Pulse
HEMTT	Heavy Expanded Mobility Tactical Truck
HIL	Human-in-the-Loop; Hardware-in-the-Loop
HMOC	Huntsville Mission Operations Center
HOSC	Huntsville Operations Support Center
HRTS	Human Resource Tracking System
HWIL	Hardware-in-the-loop
I	
I&T	Integration & Test
IA	Information Assurance
IAI	Israel Aircraft Industries
IAM	Information Assurance Manager
IAMD	Integrated Air and Missile Defense
FPAF	Fixed Price Award Fee
IAS	Interocean American Shipping
IAW	In Accordance With
IBCS	Integrated Battle Command System
IBR	Integrated Baseline Review
IBS	Integrated Broadcast Service
ICBM	Intercontinental Ballistic Missiles
ICD	Interface Control Document
ICE	Independent Cost Estimate
ICOFT	Institutional Conduct of Fire Trainer
ICP	Interface Change Proposal
IDIQ	Indefinite Delivery Indefinite Quantity
IDMP	Integrated Data Management Plan
IDT	In-Flight Interceptor Communications System Data Terminal
IEM	Integrated Electronics Module
IETM	Integrated Electronic Technical Manual
IETT	Integrated Event Test Team
IFICS	In-Flight Interceptor Communications System
ILP	Initial Lot Production
ILS	Integrated Logistics Support
IM	Insensitive Munitions
IMAP	Integrated Master Assessment Plan
IMD	Integrated Missile Defense
IMoD	Israeli Ministry of Defense
IMTP	Integrated Master Test Plan
IMU	Inertial Measurement Unit
IMVP	Integrated Master VV&A Plan
INFOSEC	Information Security
IPA	Intergovernmental Personnel Act
IR	Infra-red
IRBM	Intermediate-Range Ballistic Missiles
IRES	Integrated Research and Development for Enterprise Solutions
ISA&I	Israeli System Architecture and Integration
ISET	Integrated Systems Engineering Team
ISIM	International Simulation
ISSM	Information System Security Manager
IT	Integrated Test; Information Technology
ITB	Institutional Training Base; Israeli Test Bed
IV&V	Independent Verification and Validation
IWS	Indications and Warning System; Integrated Warfare Systems
J	

ACRONYMS AND ABBREVIATIONS

JAMEX	Jamming Exercise
JAT	Joint Analysis Teams
JBTEC	Joint BMDS Training and Education Center
JEWL	Joint Early Warning Laboratory
JFCC	Joint Functional Component Command
JFCC-IMD	Joint Functional Component Command - Integrated Missile Defense
JHU	John Hopkins University
JHU/APL	John's Hopkins University/Applied Physics Laboratory
JMOD	Japan Ministry of Defense
JNIC	Joint National Integration Center, Schriever AFB, CO
JPOW	Joint Project Optical Windmill
JRDC	JNIC) Research and Development Contract
JRMET	Joint Reliability and Maintainability Engineering Team
JTF-GNO	Joint Task Force-Global Network Operations
JTIDS	Joint Tactical Information Data System
JTOC	JNIC Target Operations Center
JWSP	Joint Warfighter Support Program
K	
KHILS	Kinetic Kill Vehicle hardware in-the-Loop Simulator
KIDD	Kinetic Impact Debris Distribution
KV	Kill Vehicle
KW	Kinetic Warhead
L	
L&TSE	Launch and Test Support Equipment
LBSM3	Land Based SM-3 (early name for Aegis Ashore)
LCC	Launcher Control Center
LFSV	Latest Fielded Software Version
LHCT	Long Haul Communications Transport
LLNL	Lawrence Livermore National Laboratory
LM	Lockheed Martin
LMSSC	Lockheed Martin Space Systems Company
LNO	Liaison Officer
LoR	Launch on Remote
LPLD	Low Power Laser Demonstrator
LRDS	Long Range Detection Suite
LRS&T	Long Range Surveillance and Tracking; Long Range Surveillance and Track
LRU	Line Replaceable Unit'
LSC	Launch Support Systems;
LSE	Launch Support Equipment
LSS	Launch Support Systems; Launch Site Controller
LTPO	Lower Tier Program Office
M	
M&S	Materials and Structure; Modeling and simulation
M&S	Models and Simulation
MAIS	Major Automated Information System
MAP	MDA Assurance Plan; MDA Assurance Provisions
MAR	MDA Assurance Representative
MARS	Modular Analysis and Reporting Suite
MARAD	Maritime Administration
MASINT	Measures and Signals Intelligence
MAX/MIF	Maximum (number of)/Missiles In Flight
MD	Missile Defense
MDA	Missile Defense Agency
MDAHQ	Missile Defense Agency Headquarters
MDAP	Major Defense Acquisition Program
MDEB	Missile Defense Executive Board

ACRONYMS AND ABBREVIATIONS

MDIOC	Missile Defense Integrated Operations Center
MDR	Mission Data Review
MDSDC	Missile Defense Space Development Center
MDSE	Missile Defense System Exerciser
MDSEC	Missile Defense Space Experimentation Center
MDST	Missile Defense Space Warning Tool
MET	Modernization Enterprise Terminal
MFRL	Modification and Fielding Request List
MFU	Missile Firing Unit
MHA	Management Headquarters Activity
MICS	MDA Integrated Communications Services
MiDAESS	Missile Defense Agency Engineering and Support Services
MIF	MIF
MILCON	Military Construction; Military Construction funding (type of Appropriation)
MIL-STD	Military Standards
MIP	Master Integration Plan
MIPR	Military Interdepartmental Purchase Request
MIS	MDSDC Interchange System; MDSEC Interchange System
MIT	Miniature Interceptor Technology; Massachusetts Institute of Technology
MIT/LL	Massachusetts Institute of Technology, Lincoln Laboratory, Lexington, MA
MMR	Multi-Mission Radar
MOC	Missile Defense Agency Operations Center
MoKVA	Modular open Kill Vehicle Architecture
MOU	Memorandum of Understanding
MPAT	Producibility and Manufacturing Technology
MPL	ManPower Loading
MRA	Mission Readiness Assessment
MRBM	Medium-Range Ballistic Missiles
MRT	Medium Range Target
MRTF	Major Range and Test Facilities
MSR	Minimum Sustaining Rate
MTOE	Modified Table of Organization and Equipment
MTS	Multi-Spectral Targeting System
MTS-C	Multi-Spectral Targeting System-Cs
N	
NASIC	National Air and Space Intelligence Center
NATO	North Atlantic Treaty Organization
NAVFAC	Naval Facilities Engineering Command; Naval Facility
NAVSEA	Naval Sea Systems Command
NAWC	Naval Air Warfare Center
NCR	National Capital Region
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NFIRE	Near Field Infrared Experiment
NGAS	Northrop Grumman Aerospace Systems
NGST	Northrop Grumman Space Technology
NIPRNET	Non-Secure Internet Protocol Router Network
NIST	National Institute of Standards and Technology
NORAD	North American Aerospace Defense Command
NORTHCOM	Northern Command
NRE	non-recurring engineering
NRL	Naval Research Laboratory, Washington, DC
NRT	Navy Review Team
NSA	National Security Agency
NSWC	Naval Surface Warfare Center
NTD	Near-Term Discrimination

ACRONYMS AND ABBREVIATIONS

O	
O&M	Operations and Maintenance
O&S	Operations and Sustainment
OA	Open Architecture
OCO	Overseas Contingency Operations
OCONUS	Outside of CONUS
OGA	Other Government Agency
OMB	Office of Management and Budget
ONIR	Overhead Non-Imaging Infra-Red
OPIR	Overhead Persistent Infrared
OPLAN	Operations Plan
OPSCAP	Operations Capabilities
OPTISIG	Optical Signatures In-Line Generator
ORNL	Oak Ridge National Laboratory
OSA	Open Systems Architecture
OSC	Operations Support Center
OSD	Office of the Secretary of Defense
OSF	Objective Simulation Framework
OSFC	Operations Forces Standing Committee
OSM	Object Sighting Message; Open Systems Architecture Sensor Models
OSPT	Operations Support Planning Team
OSS	Off-Shore Support; Optimistic Sensor Model
OTA	Operational Test Agencies
P	
P&P	Policy and Procurement
PA	Performance Assessments; Project Arrangement
PAA	Phased Adaptive Approach
PAAWNS	Protected Anti-Jam (AJ) / Anti-Scintillation (AS) Wideband Network System
PAC-3	Patriot Advanced Capability-3
PACOM	U.S. Pacific Command
PAM	Planning Allocation Matrix
PB	President's Budget
PBL	Performance Based Logistics
PCO	Procurement Contracting Office
PDR	Preliminary Design Review
PDSS	Post Deployment Software Support
PE	Program Element
PEELS	Parametric Endo/Exo-atmospheric Lethality Simulation
PEGEM	Post Engagement Ground Effects Model
PEO IWS	Program Executive Office - Integrated Warfare Systems
PFR	Post Flight Reconstruction
PHACIL	Phacil, Incorporated
PIA	Post Intercept Assessment
PIDS	Prime Item Development Specifications
PLET	Phenomenology, Lethality, Environment, Threat
PLT	Production Lead Time
PLUS	Plume Simulation
PM	Program Manager
PM/IAM	Program Manager/Information Assurance Manager
PMAP	Process Mission Assurance Plan
PMDCATS	Program Manager - Communications and Transmission Systems
PME	Primary Mission Equipment
PMI	preventative maintenance inspection
PMP	Parts, Materials and Processes
PMRF	Pacific Missile Range Facility, Barking Sands, Kauai, HI
PMT	Pre-Mission Test

ACRONYMS AND ABBREVIATIONS

POA&M	Plan of Action and Milestones
POC	Point of Contact
PPR	Pre-Planned Responses
PPU	Prime Power Unit
PROCAP	Protection Capability
PSEM	Patriot System Effectiveness Model
PSN	Parallel Staging Area
PTSS	Precision Tracking Space System
PWS	Program-Wide Support
PY	Prior Year
Q	
QLB	Quick Look Briefing
QoS	Quality of Service
QRT	Quick Response Team
Q SMA	Quality Safety and Mission Assurance
R	
RAFU	Radar Field Upgrade
RAM	Reliability, Availability and Maintainability
RASP	Rapid Scenario Prototype
RCS	Radar Cross Section
RDEC	Research, Development, and Engineering Center
RDECOM	Research, Development, Engineering Command
RDT&E	Research, Development, Test & Evaluation
RF	Radio Frequency
RFA	Requests for Analysis
RFARFI	Request for Analysis Request for Information
RFI	Requests for Information
RFP	Request for Proposal
RMF	Risk Management Framework
RMF	Risk Management Framework
RMOET	Radar March Order & Emplacement Trainer
ROI	Return on Investment
ROIC	Read Out Integrated Circuit
RPFM	Rocket Plume Flowfield Model
RSC	Radar Sustainment Contract
RSO	Resident Space Object
RTI	Return to Intercept
RTS	Ronald Reagan Test Site, Kwajalein, Marshall Islands
RV	Reentry Vehicle
S	
SATCOM	Satellite Communications
SBIR	Small Business Innovative Research
SBIR/STTR	Small Business Innovative Research/Small Business Technology Transfer
SBIRS	Space Based Infrared System
SBT	Sea Based Terminal
SBX	Sea Based Test X-Band Radar
SCA	Security Control Assessments
SCARE	Software Change Analysis Review Environment
SCD	SM-3 Cooperative Development; Standard Missile-3 Cooperative Development (Program)
SCG	Security Classification Guides
SCN	System Change Notices
SCORE	System Coordination and Observation Reporting Environment
SCR	SM-3 Cooperative Development; System Capability Review
SCRM	Supply Chain Risk Management
SDACS	Solid Divert Attitude Control System

ACRONYMS AND ABBREVIATIONS

SDD	System Description Document
SDL	Space Dynamics Laboratory
SDR	System Design Review; Software Design Review
SE&I	Systems Engineering and Integration
SEI	Systems Engineering & Integration
SEAR	System Engineering Assessment Report
SED	Software Engineering Design
SEPM	System Engineering Program Management
SGP	Super Green Pine
SIAO	Senior Information Assurance Officer
SIAO/CA	Senior Information Assurance Officer (SIAO)/Certification Authority (CA)
SIGNIT	Signal Intelligence
SIM	Simulation
SIPRNET	Secret Internet Protocol Router Network
SIU	SSF Interface Unit
SIV	silo interface vault
SKA	Space-based Kill Assessment
SM	Standard Missile
SM-3	Standard Missile -3
SMDC	Space and Missile Defense Command, U.S. Army
SMDC/ARSTRST	Space and Missile Defense Command/Army Forces Strategic Command
SME	Subject Matter Expert
SMM	System Mission Manager
SNL	Sandia National Lab
SNWC	Space and Naval Warfare Command
SOLD	Simulation-Over-Live Driver
SPAWAR	Naval Space and Warfare Command; Space and Naval Warfare Systems Command
SPFR	System Post Flight Reconstruction
SPMT	System Pre Mission Test
SPS	Standard Procurement System
SPURC	Standard Plume Ultraviolet Radiation Code
SRALT	Short Range Air Launch Target
SRBM	Short-Range Ballistic Missiles
SRBMD	Short Range Ballistic Missile Defense
SRHSM	Sensor Registration Health & Status Monitoring
SRP	Stockpile Reliability Program
SRR	System Requirements Review; Software Readiness Review
SS	Sole Source; Summary Screens; System Specification
SS/CPAF	Sole Source/ Cost Plus Award Fee
SS/CPFF	Sole Source/ Cost Plus Fixed Fee
SSA	Space Situational Awareness
SSC	System Security Concept
SSF	Single Stimulation Framework
STEM	Science, Technology, Engineering, and Mathematics
STFM-01	Standard Missile-3 Flight Test Standard Missile-01
STOC	System Test and Operations Center
STRATCOM	US Strategic Command
STSS	Satellite Tracking and Surveillance System; Space Tracking and Surveillance System
STTR	Small Business Technology Transfer
SYMP	Symposium
T	
T&E	Test and Evaluation
TALSS	THAAD Active Leak Sensor System
TC	Targets and Countermeasures
TCD	Technical Capability Declaration
TCM	Total downtime due to corrective maintenance actions including logistics
TDA	Table of Distribution and Allowances

ACRONYMS AND ABBREVIATIONS

TDA	Technical Decision Authority
TDACS	Throttleable Divert and Attitude Control System
TDS	Terminal Defense Segment
TEC	Test Execution Control
TECC	Theater Enterprise Computing Center
TECHREP	Technical Representative
TFCC	THAAD Fire Control and Communications
TGx	Trajectory Generator - External
THAAD	Terminal High Altitude Area Defense
TIL	Test Integration Lab
TIM	Technical Interchange Meeting
TMC	Threat Modeling Center
TMI	Technology Maturation Initiatives
TMSS	Threat Modeling Simulation System
TOO	Test of Opportunity; Target of Opportunity
TOR	Trouble Observation Reports
TPM	Technical Performance Measurement; Total downtime due to preventative maintenance actions including logistics delay
TRIMM	Transmit/Receive Integrated Microwave Module
TRM	Test Resource Manager
TRMP-T	Test Resources Mission Planning Tool
TSG	Tactical Support Groups
TSS	Training Support System
TT	Total Time
TTP	Tactics, Techniques & Procedures
TU	Threat Upgrade
U	
UARC	University Affiliated Research Center
UAV	Unmanned Aerial Vehicle
UEWR	Upgraded Early Warning Radar
ULCHI	Ulchi Freedom Guardian
UNET	Unclassified Network
USAFE	U.S. Air Forces in Europe
USDAT&L	Office of Under Secretary of Defense/Acquisitions, Technology and Logistics OUSD/AT&L
USN	United States Navy
USNORTHCOM	United States Northern Command
USPACOM	United States Pacific Command
USSTRATCOM	United States Strategic Command
UUR	University-to-University
V	
V&A	Verification & Assessment
V&V	verification and validation
VACSSim	Virtual Aegis Combat System Simulation
VAFB	Vandenberg Air Force Base, CA
VGI	VLS GPS Interface
VLS	Vertical Launching System; Vertical Launch System
VOIP	Voice Over Internet Protocol
VTC	Video Teleconferencing
VV&A	Verification, Validation, and Accreditation
VVACB	Verification, Validation and Accreditation Control Board
VVAWG	VV&A working group
W	
WETLANS	Wargames, Exercises and Training Local Area Networks
WIP	Warfighter Involvement Process
WSC	Wargames Support Center

ACRONYMS AND ABBREVIATIONS

WSMR	White Sands Missile Range, White Sands, NM
WSTF	White Sands Test Facility
X	
XAOR	Cross-Area of Responsibility
XBR	X-Band Radar
Y	
YPG	Yuma Proving Ground

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603176C / <i>Advanced Concepts and Performance Assessment</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	28.771	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
MD71: <i>Advanced Concepts and Performance Assessments</i>	27.741	13.961	11.612	11.628	-	11.628	11.568	11.791	12.039	12.267	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	1.030	0.573	0.829	0.605	-	0.605	0.648	0.671	0.743	0.740	Continuing	Continuing
MC71: <i>Cyber Operations</i>	-	0.000	0.555	0.784	-	0.784	2.051	2.437	2.453	3.217	0.000	11.497

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

The Advanced Concepts & Performance Assessments PE delivers an integrated government concept definition, simulation, and analysis capability. It also centralizes assessment of advanced ballistic missile defense technology. Delivering insight into the performance of proposed concepts extends MDA's ability to address evolving threats for the warfighter.

Subject matter experts provide independent assessments of government, university, and industry technology concepts, used in concert with systems engineering requirements, to support acquisition strategy decisions and define technology focus areas. The innovative structured concept definition and assessment methodology enables the MDA to quickly validate focus areas, verify contractor technology solutions, and evaluate promising concepts in future Ballistic Missile Defense System (BMDS) architectures. This methodology significantly enhances MDA's ability to assess technology concepts while decreasing the cost of development through:

- Independent model-based simulations of industry technology concepts to inform the systems engineering process
- Digital simulation and hardware-in-the-loop performance assessments of algorithms and hardware concepts prior to expensive live fire test events
- End-to-end testing of technology concepts integrated with weapon systems and Command, Control, Battle Management and Communications

Performance assessment of advanced concepts incorporates Better Buying Power philosophy in the earliest stages of technology development to maximize the efficiency of technology investments. Performance assessment supports evaluation and analysis of capabilities across right and left of launch.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603176C / <i>Advanced Concepts and Performance Assessment</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	17.880	12.996	13.741	-	13.741
Current President's Budget	14.534	12.996	13.017	-	13.017
Total Adjustments	-3.346	0.000	-0.724	-	-0.724
• Congressional General Reductions	-2.865	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.131	0.000			
• SBIR/STTR Transfer	-0.350	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-0.724	-	-0.724

Change Summary Explanation

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603176C / <i>Advanced Concepts and Performance Assessment</i>				Project (Number/Name) MD71 / <i>Advanced Concepts and Performance Assessments</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD71: <i>Advanced Concepts and Performance Assessments</i>	27.741	13.961	11.612	11.628	-	11.628	11.568	11.791	12.039	12.267	Continuing	Continuing

Note

N/A

A. Mission Description and Budget Item Justification

Advanced Concepts & Performance Assessment centralizes advanced technology concept modeling, simulation, software, and analysis. Integrating models of promising technical solutions into BMDS system-level simulations enables leadership to make data driven acquisition and technology investment decisions. This funding capitalizes on the innovation of small business, universities, Federally Funded Research and Development Centers, and University Affiliated Research Centers to pursue a broad range of hardware, software, models, algorithms, trade studies and analysis. These innovations bring together government developed models representing existing and future ballistic missile defense architectures, technology concepts, and advanced algorithms to provide detailed assessments of concept performance and inform investment decisions. These innovations, combined with a robust high performance computing infrastructure, provide a unique in-house government capability to demonstrate and assess technology concepts.

B. Accomplishments/Planned Programs (\$ in Millions)

Title: Advanced Concepts and Performance Assessment

Description: Provide quantitative assessments that define the benefits of technology investments and inform requirements using an integrated concept definition, simulation, and performance analysis capability. A staff of diverse subject matter experts deliver independent government performance evaluations which exercise kinetic and non-kinetic missile defense concept representations against the broad spectrum of evolving threats.

- Assess forward-based airborne electro-optical infrared and advanced sensors
- Provide independent government assessments of industry sensor (e.g. Advanced Sensor), directed energy (e.g. Low Power Laser Designator), Space Based Interceptor and kill vehicle (e.g. Multi Object Kill Vehicle) technology concepts
- Examine directed energy pathfinder solutions
- Study low earth orbit satellite capabilities
- Assessment and identification of promising boost phase intercept capabilities
- Perform concept performance against emerging advanced threats including hypersonic threat testing scenarios
- Mature advanced technology concepts through lab, ground, and flight test data
- Apply concepts in simulated exercises with weapon systems
- Work with the BMDS Architect and MDA Systems Engineer to design concepts, build models and assess technology concepts for the future BMDS

	FY 2017	FY 2018	FY 2019
	13.961	11.612	11.628

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603176C / <i>Advanced Concepts and Performance Assessment</i>	Project (Number/Name) MD71 / <i>Advanced Concepts and Performance Assessments</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019
- Develop and extend modeling techniques - Focus research and engineering activities from university and small business partners to identify suitable technology and concepts that improve BMDS performance through a rapid innovation model based on engineering test bed Specific and/or unique accomplishments to each FY are as follows: FY 2018 Plans: - SEE ABOVE. FY 2019 Plans: - SEE ABOVE. FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	13.961	11.612	11.628

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603178C: <i>Weapons Technology</i>	47.403	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603180C: <i>Advanced Research</i>	27.185	20.184	20.365	-	20.365	20.778	21.194	21.652	22.036	Continuing	Continuing
• 0603294C: <i>Common Kill Vehicle Technology</i>	54.395	252.879	189.753	-	189.753	205.645	254.130	122.494	52.373	Continuing	Continuing

Remarks

D. Acquisition Strategy

Partner with small businesses, the Aviation & Missile Research Development & Engineering Center, Federally Funded Research and Development Centers, and University Affiliated Research Centers to provide concept modeling and assessment capability. This innovative strategy leverages agency and partner subject matter experts and government model-based assessments to inform Better Buying Power acquisition decisions.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603176C / <i>Advanced Concepts and Performance Assessment</i>				Project (Number/Name) MD40 / <i>Program-Wide Support</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	1.030	0.573	0.829	0.605	-	0.605	0.648	0.671	0.743	0.740	Continuing	Continuing

A. Mission Description and Budget Item Justification

Program Wide Support (PWS) contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603176C / <i>Advanced Concepts and Performance Assessment</i>	Project (Number/Name) MC71 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC71: <i>Cyber Operations</i>	-	0.000	0.555	0.784	-	0.784	2.051	2.437	2.453	3.217	0.000	11.497

Note

N/A

A. Mission Description and Budget Item Justification

This project supports the monitoring and tracking of Cybersecurity mitigations as required in the Department of Defense Instruction Number 8510.01 which establishes risk Management Framework (RMF) requirements for DoD Information Technology (IT). Funds in this project implement and sustain DoD-required RMF and associated Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance System Security Manager (PM/ISSAM) Plans of Action and Milestones (POAMs) for enabling M&S mission systems. This project captures the RMF documentation (artifacts, validation results, Information Assurance Risk Assessment results, and MDA Authorizing Official (AO) and Chief Information Officer (CIO) accreditation decisions) into the Defense Information Systems Agency's (DISA) Enterprise Mission Assurance Support Service (eMASS) system. Hardware and software upgrades required to meet DoD standards are supported by funding in this project. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act.

B. Accomplishments/Planned Programs (\$ in Millions)

Title: Information Assurance / Cyber Network Defense	FY 2017	FY 2018	FY 2019
<p>Description: Funds network defense and Information System Security Manager activities including:</p> <ul style="list-style-type: none"> -Conduct cybersecurity/information assurance engineering and architecture planning. -Plan and test information assurance controls. -Develop DoD Risk Management Framework certification and accreditation packages. -Conduct Controls Validation Testing of systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies. -Conduct annual information assurance reviews to assess compliance in implementing and maintaining information assurance controls. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans:</p>	0.000	0.555	0.784

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603176C / <i>Advanced Concepts and Performance Assessment</i>	Project (Number/Name) MC71 / <i>Cyber Operations</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2017	FY 2018	FY 2019
- SEE ABOVE.				
FY 2018 to FY 2019 Increase/Decrease Statement: The increase in FY2019, expands on-going Risk Management Framework development to meet certification and accreditation standards.				
Accomplishments/Planned Programs Subtotals		0.000	0.555	0.784
C. Other Program Funding Summary (\$ in Millions) N/A				
Remarks				
D. Acquisition Strategy N/A				
E. Performance Metrics N/A				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603178C / <i>Weapons Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	156.927	47.403	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MD69: <i>Directed Energy Research</i>	72.320	24.173	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MD72: <i>Interceptor Technology</i>	81.771	21.110	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	2.836	2.120	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

In FY 2018, the Weapons Technology Program Element (PE) (0603178C) concludes the Federally Funded Research Development Center (FFRDC) laboratory directed energy laser activity. Laser scaling efforts will be addressed in the Technology Maturation Initiatives (TMI) PE (0604115C).

A. Mission Description and Budget Item Justification

The Weapons Technology Program Element develops and tests a high-powered directed energy laser to build the foundation of the next-generation laser system on a high altitude unmanned airborne platform. The MDA's High Energy Laser (HEL) investment incrementally develops scalable, efficient, and compact HEL technology in the laboratory before beginning a high power laser flight test program. The technology required for tracking the target, aiming the laser, and building flight demonstrators is developed under the TMI PE (0604115C).

MDA collaborates with the Office of the Assistant Secretary of Defense for Research and Engineering, the Defense Advanced Research Projects Agency (DARPA), the High Energy Laser Joint Technology Office (HELJTO), and the Air Force in a systems engineering based strategy to research, develop and test directed energy weapons technology. MDA is developing a set of common core technology that will enable both missile defense and air dominance missions. These core technologies include fiber launchers; high brightness, high efficiency diode pump modules; and high power, high efficiency fiber amplifiers. In FY 2017, MDA, DARPA and the Air Force will complete a 30 kilowatt packaged Fiber Combined Laser (FCL) system at the Massachusetts Institute of Technology Lincoln Laboratory. The system consists of the laser, batteries and thermal device. MDA will also upgrade the Diode Pumped Alkali Laser (DPAL) testbed at Lawrence Livermore National Laboratory to conduct a 30 kilowatt demonstration with improved beam quality. In FY 2018, MDA will complete these final milestones and conclude the FFRDC laboratory high-powered directed energy laser activity.

The Agency will make the directed energy technology developed under this PE available to industry for incorporation into the Low Power Laser Demonstrator and for further laser scaling development to power levels required for robust, speed of light missile defense.

The Common Kill Vehicle Technology PE 0603294C will address any future technology investments in Solid Divert and Attitude Control System (SDACS) beginning in FY 2018.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603178C / <i>Weapons Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	71.843	5.495	0.000	-	0.000
Current President's Budget	47.403	5.495	0.000	-	0.000
Total Adjustments	-24.440	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-22.200	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.087	0.000			
• SBIR/STTR Transfer	-1.153	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603178C / Weapons Technology				Project (Number/Name) MD69 / Directed Energy Research			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD69: <i>Directed Energy Research</i>	72.320	24.173	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

In FY 2018, the Directed Energy Research project (MD69) concludes the FFRDC laboratory high-powered directed energy laser activity. Laser scaling efforts transfer to the TMI PE (0604115C) under the Directed Energy Demonstrator Development project (MD98).

A. Mission Description and Budget Item Justification

The MDA mission is to develop a robust system to defend the United States against ballistic missile attacks at all ranges, in all phases of flight. Using Directed Energy weapons to negate a ballistic missile in boost phase, before a threat missile can deploy countermeasures, will revolutionize missile defense by dramatically reducing the role of interceptors. In FY 2010, the Airborne Laser program proved it is possible to acquire, track and destroy a boosting missile, addressing many aspects of the boost phase kill, but also underscoring the complexity and challenges of fielding such a weapon system. The experience gained from that successful first foray into directed energy system illuminates a new path that integrates a highly efficient, compact electric laser into a high altitude, low-Mach Unmanned Aerial Vehicle capable of flying in the stratosphere. Flying at low speed in relatively calm air at 60,000 feet significantly reduces the need for the complex beam pointing and atmospheric jitter compensation systems that were challenges for the Airborne Laser program. The key to realizing this future high altitude, unmanned directed energy system is the laser.

The Directed Energy Research project funds the laboratory development of two high energy laser technologies, the DPAL with Lawrence Livermore National Laboratory (LLNL) and FCL with the Massachusetts Institute of Technology Lincoln Laboratory (MIT/LL). Both laser technologies have considerable promise for scaling to very high average power while simultaneously achieving high system electrical-to-optical efficiencies, exceeding 40 percent, and very low system weight and volume.

The MDA strategy is to reduce technical risk through dual path laboratory development and transition the laboratory development to industry in FY 2018 for high altitude unmanned platform integration and test.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2017	FY 2018	FY 2019
Title: Directed Energy Research	24.173	5.495	0.000
Description: Directed Energy Research funds two promising laser technologies: LLNL's DPAL and MIT/LL's FCL. Each technology takes a unique approach to attaining high power. The DPAL scales in power by increasing the size of a single laser gain cell. This approach has the benefit of simplicity of design, but must address very high energy levels within the single cell. LLNL successfully demonstrated over 16 kilowatts (kW) in FY 2016; will demonstrate 30 kW in FY 2018.			
MDA's key fiber laser investments are targeted at driving the weight per kilowatt of power in the fiber amplifier system down while increasing the individual fiber amplifier power output. MDA joined with DARPA and the Air Force to demonstrate 44 kW in a room-sized, 40 kilogram per kilowatt configuration in FY 2015, to a packaged 7 kilograms per kilowatt 30 kW system in FY 2018.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603178C / <i>Weapons Technology</i>	Project (Number/Name) MD69 / <i>Directed Energy Research</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019
Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans: - SEE ABOVE.			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: The decrease in FY 2019 reflects the conclusion of the Federally Funded Research Development Center (FFRDC) laboratory high-powered directed energy laser activity. Laser scaling efforts will be addressed in the Technology Maturation Initiative (TMI) PE (0604115C) in FY 2019.			
Accomplishments/Planned Programs Subtotals	24.173	5.495	0.000

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603176C: <i>Advanced Concepts and Performance Assessment</i>	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603180C: <i>Advanced Research</i>	27.185	20.184	20.365	-	20.365	20.778	21.194	21.652	22.036	Continuing	Continuing
• 0603890C: <i>BMD</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
<i>Enabling Programs</i>											
• 0604115C: <i>Technology Maturation Initiatives</i>	84.514	128.406	148.822	-	148.822	172.423	143.240	143.938	174.770	Continuing	Continuing

Remarks

D. Acquisition Strategy
The acquisition strategy for the MD69, Directed Energy Research, consists of partnering with Industry, the DARPA, the Air Force, Federally Funded Research and Development Centers and University Affiliated Research Centers. The MDA will leverage Agency and partner subject matter experts and use government model based assessments to inform Better Buying Power philosophy acquisition decisions. The MDA will then award contracts to industry and universities via the Advanced Technology Innovation Broad Agency Announcement and competitive procurements to develop and demonstrate promising components and integrated systems in realistic test environments.

E. Performance Metrics
N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603178C / <i>Weapons Technology</i>				Project (Number/Name) MD72 / <i>Interceptor Technology</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD72: <i>Interceptor Technology</i>	81.771	21.110	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

The Common Kill Vehicle Technology PE 0603294C will address any future technology investments in Solid Divert and Attitude Control System beginning in FY 2018.

A. Mission Description and Budget Item Justification

The Interceptor Technology project developed Divert and Attitude Control System (DACS) technology to enhance operational performance of future Multi Object Kill Vehicle (MOKV). Technology investment focused on DACS subsystem and system elements that support longer operation, multiple discrete DACS firing events, precision attitude control, safe operation and minimum kill vehicle mass. In FY 2017, MDA continued investment in a competitive next generation solid DACS development with industry to reduce propulsion component risk for the MOKV. The concept(s) developed for MOKV application transitioned to implementation with the industry MOKV developers. MDA continued to conduct testing of lightweight, long duration Cooled Gas and Multi-Pulse Attitude Control Systems having application to both a Kill Vehicle and a Third Stage Rocket Motor, while anchoring system sizing and performance prediction models. MDA defined the baseline requirements using analytical tools to identify mature technology capable of supporting MOKV development.

The project also modeled and assessed electromagnetic rail gun projectile technology readiness, suitability, and integration requirements for ballistic missile defense applications.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2017	FY 2018	FY 2019
Title: Interceptor Technology	21.110	0.000	0.000
<p>Description: Interceptor Technology focuses on development and test of component and sub-systems for a solid propulsion DACS, including propellant tanks, Attitude Control System and divert thrusters, and pressurant subsystems. This project will also investigate electromagnetic rail gun suitability and integration requirements for ballistic missile defense applications. This is a continuation of systems engineering and analysis that began under the BMD Enabling Programs program element, 0603890C in FY 2014.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: The Common Kill Vehicle Technology PE 0603294C will address any future technology investments in Solid Divert and Attitude Control System (SDACS) beginning in FY 2018.</p> <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603178C / <i>Weapons Technology</i>	Project (Number/Name) MD72 / <i>Interceptor Technology</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019
N/A			
Accomplishments/Planned Programs Subtotals	21.110	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603176C: <i>Advanced Concepts and Performance Assessment</i>	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603180C: <i>Advanced Research</i>	27.185	20.184	20.365	-	20.365	20.778	21.194	21.652	22.036	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0604894C: <i>Multi Object Kill Vehicle</i>	0.000	6.500	8.256	-	8.256	33.935	8.277	184.118	355.060	0.000	596.146

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603178C / <i>Weapons Technology</i>			Project (Number/Name) MD40 / <i>Program-Wide Support</i>				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	2.836	2.120	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603179C / <i>Advanced C4ISR</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	35.531	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	39.020
MD73: <i>Advanced C4ISR</i>	34.388	3.327	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	37.715
MD40: <i>Program-Wide Support</i>	1.143	0.162	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.305

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

For FY18 and beyond, the discrimination technologies developed under this PE have been transitioned to the Ballistic Missile Defense Sensors (0603884C) Program Element for further refinement and implementation.

The Advanced Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Program Element develops future BMDS capabilities to out-pace emerging and evolving threats and identifies, develops, and readies for transition the technical solutions that address shortfalls identified by the Combatant Commanders. MDA uses the Prioritized Capabilities List (PCL) and the Agency's Achievable Capabilities List (ACL) to prioritize technology investments including Advanced C4ISR. MDA's investments balance the pursuit of promising next generation technology with the need for near-term solutions to enhance existing BMDS capability.

MD40 Program-Wide Support (PWS) consists of essential non-headquarters management efforts providing integrated and efficient support to MDA functions and activities across the entire BMDS.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603179C / <i>Advanced C4ISR</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	3.626	0.000	0.000	-	0.000
Current President's Budget	3.489	0.000	0.000	-	0.000
Total Adjustments	-0.137	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.053	0.000			
• SBIR/STTR Transfer	-0.084	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603179C / <i>Advanced C4ISR</i>				Project (Number/Name) MD73 / <i>Advanced C4ISR</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD73: <i>Advanced C4ISR</i>	34.388	3.327	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	37.715

Note
The decrease in FY 2017 is due to the completion of technology development efforts.

A. Mission Description and Budget Item Justification

Advanced Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) enables rapid, exponential capability increases in the Ballistic Missile Defense System (BMDS) command, control, battle management and communications (C2BMC) and existing sensor networks. MDA will develop and mature technology, software and algorithms to facilitate integration of Service command and sensor network approaches into the BMDS.

This Program Element also included support for C2BMC centric discrimination improvements for Near-Term and Mid-Term capability fielding. For FY18 and beyond, the discrimination technologies developed under this PE have been transitioned to the Ballistic Missile Defense Sensors (0603884C) Program Element for further refinement and implementation.

B. Accomplishments/Planned Programs (\$ in Millions)

Title: Advanced X-Band Radar Capabilities	FY 2017	FY 2018	FY 2019
Description: Development and incorporation of advanced discrimination algorithms into X-Band Radars (XBRs). Specific and/or unique accomplishments to each FY are as follows:	3.327	0.000	0.000
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals			
	3.327	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603179C / <i>Advanced C4ISR</i>	Project (Number/Name) MD73 / <i>Advanced C4ISR</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603898C: <i>Ballistic Missile Defense Joint Warfighter Support</i>	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing

Remarks

D. Acquisition Strategy

Advanced X-Band Radar Capabilities follow the MDA capability-based acquisition strategy that emphasizes testing, development and evolutionary acquisition. The advanced technology development will include development of target acquisition and discrimination algorithms and assessment of performance. Performance assessment and transition risk reduction will use modeling, simulation, and online or offline assessment of live tracking opportunities. When ready, technology will transition to appropriate program elements for advanced component development and integration into BMDS X-Band Radars.

The Radar Sustainment Contract (RSC) will be used for both advanced technology development and for transition of technology to systems. The RSC is an Indefinite Delivery/Indefinite Quantity (IDIQ) task order contract awarded in 2012 to sustain all the BMDS X-Band Radars. The contract provides sustainment of previously developed X-Band radar products, such as:

- Software maintenance of existing software developed to support the X-Band Radars
- Models & Simulation - development, maintenance, and verification of high fidelity models, support for war games and exercises, and support for performance assessment events
- Engineering Services - engineering support for deployed radars to facilitate maintenance efforts which may include but are not limited to hardware obsolescence studies, hardware redesign, technology insertion, and refurbishment efforts
- BMDS Test Planning, Execution, and Analysis - planning, execution and analysis of BMDS test requirements for previously developed hardware and software in accordance with the MDA Integrated Master Test Plan (IMTP).

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 3	PE 0603179C / <i>Advanced C4ISR</i>	MD73 / <i>Advanced C4ISR</i>

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603179C / <i>Advanced C4ISR</i>			Project (Number/Name) MD40 / <i>Program-Wide Support</i>				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	1.143	0.162	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.305

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603180C / <i>Advanced Research</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	57.992	27.185	20.184	20.365	-	20.365	20.778	21.194	21.652	22.036	Continuing	Continuing
MD25: <i>Advanced Technology Development</i>	57.066	26.364	19.302	19.461	-	19.461	19.848	20.239	20.643	21.033	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	0.926	0.821	0.882	0.904	-	0.904	0.930	0.955	1.009	1.003	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

FY 2017 Amended Budget Request Justification: \$+4.300M was received to address Joint Emergent Operational Need requirement to ensure readiness of the BMDS. \$+4.300M Project MD25 - Advanced Technology Development/Advanced Research to begin FY 2017 National Defense Authorization Act (NDAA) required development of a Hypersonic Threat Defense program. Leverages Army Night Vision Lab and other Services' investments in large Focal Panel Arrays (FPA) that can maintain high sensitivity at higher operating temperature.

A. Mission Description and Budget Item Justification

The Advanced Research PE conducts leading edge advanced research and development to create and enable future missile defense capabilities. Missile Defense Agency executes this mission by capitalizing on the creativity and innovation of the brightest minds in our Nation's universities and small businesses, collaborative research partnerships between allied country academic institutions, and innovative ideas from industry. This includes a focus on facilitating the transition of technology to the Ballistic Missile Defense System (BMDS) through a Commercialization and Transition Office and the execution of the Rapid Innovation Fund Program.

FY 2017 Amended Budget Request Justification: \$+4.300M was received to address Joint Emergent Operational Need requirement to ensure readiness of the BMDS. \$+4.300M Project MD25 - Advanced Technology Development/Advanced Research to begin FY 2017 National Defense Authorization Act (NDAA) required development of a Hypersonic Threat Defense program. Leverages Army Night Vision Lab and other Services' investments in large Focal Panel Arrays (FPA) that can maintain high sensitivity at higher operating temperature.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603180C / <i>Advanced Research</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	27.733	20.184	20.695	-	20.695
Current President's Budget	27.185	20.184	20.365	-	20.365
Total Adjustments	-0.548	0.000	-0.330	-	-0.330
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.548	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-0.330	-	-0.330

Change Summary Explanation

FY 2017 Amended Budget Request Justification: \$+4.300M was received to address Joint Emergent Operational Need requirement to ensure readiness of the BMDS. \$+4.300M Project MD25 - Advanced Technology Development/Advanced Research to begin FY 2017 National Defense Authorization Act (NDAA) required development of a Hypersonic Threat Defense program. Leverages Army Night Vision Lab and other Services' investments in large Focal Panel Arrays (FPA) that can maintain high sensitivity at higher operating temperature.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603180C / <i>Advanced Research</i>				Project (Number/Name) MD25 / <i>Advanced Technology Development</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD25: <i>Advanced Technology Development</i>	57.066	26.364	19.302	19.461	-	19.461	19.848	20.239	20.643	21.033	Continuing	Continuing

Note

N/A

A. Mission Description and Budget Item Justification

MDA explores potential new Ballistic Missile Defense (BMDS) capabilities by leveraging the creativity and innovation of the Nation's small businesses and universities to conduct advanced technology development. MDA also pursues advanced technology development through cooperative international research agreements between U.S. and foreign universities of allied nations. The program manages the selection process and administers the Missile Defense Small Business Innovation Research program element, 0605502C. Small Business Innovation Research topics and projects are selected annually based on identified needs across the BMDS and executed in partnership with sponsoring intra-agency organizations.

MDA's Advanced Technology Development Project pursues a broad range of emerging technology targeted for application and insertion into the BMDS. This work facilitates the commercialization and transition of promising technology into the BMDS by promoting a cooperative environment to reduce cost and increase return on investment between small business, prime contractors, and MDA elements.

B. Accomplishments/Planned Programs (\$ in Millions)

Title: Advanced Research	FY 2017	FY 2018	FY 2019
Description: This activity funds technology/research initiatives. -Conduct systems engineering, integration, research, and material solution analysis to identify initiatives and technology to include missiles, sensors, and command and control components in the defense against current and future threats -Utilize NanoSat technology demonstrations to conduct testing and reduce risk for new and advanced technologies for the BMDS -Leverage university to university international research opportunities with allied nations to enhance BMDS advanced technology initiatives and build stronger relationships with allies and partners -Manage the selection process of Small Business Innovation Research and Technology Applications programs to assist MDA-funded technology developers in finding and entering technology transfer opportunities to missile defense applications Specific and/or unique accomplishments to each FY are as follows: FY 2018 Plans: -Partner with industry, universities and national laboratories through advanced technology initiatives to develop improvements, including: --Nano-technology initiatives ---Propellants	26.364	19.302	19.461

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603180C / <i>Advanced Research</i>	Project (Number/Name) MD25 / <i>Advanced Technology Development</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> ---Batteries ---Electronics ---Multifunctional structures ---Thermal management ---Electro-optics --Additive manufacturing technology initiatives for interceptor propulsion and structural components --Space and sensor technology ---Nanosat technology demonstrations ---Radiation hardened mirror technology ---Radiation hardened strained-layer superlattice focal plane arrays ---BMDS nosecone test program to mature nosecone manufacturing technology to a high technology readiness level for implementation into the BMDS ---4D carbon-carbon manufacturing process addressing obsolescence issue ---Next generation seeker window development ---Deep learning algorithms for missile discrimination --Directed energy technology ---High power optical fibers ---Quick recovery high energy diodes ---Ultra low size weight and power diode pump modules ---Large stroke, high spatial bandwidth, deformable mirrors ---Light weight, dampened optical benches ---Optics and coatings for alkali environments --Interceptor technology ---Aerospace-grade Rayon technology development ---Liquid bipropellant combustion models ---Liquid propellant neutralization ---Navigation algorithm technology development --Future Ballistic Missile Defense System concept development ---Advanced sensor algorithm initiative ---Aerospace vehicle target, tracking, and discrimination ---Radar interferometric processing for electro magnetic rail gun -Pursue on-going scientific and engineering university research initiatives and projects, including: <ul style="list-style-type: none"> --Johns Hopkins University: Improvements in Thermal Battery Capabilities --North Carolina State University/Czech Tech University: Space Debris Exploration: Modeling and Fusion Algorithms 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603180C / <i>Advanced Research</i>	Project (Number/Name) MD25 / <i>Advanced Technology Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019
<p>--Penn State University: Development of High Performance W-Based Alloys with Sub-Grained Microstructure by Field Assisted Sintering Technology for Rocket Nozzles:</p> <p>--Purdue University: Development and Characterization of Hypergolic Propellants</p> <p>--Purdue University: Investigation of Root Causes of Combustion Instability</p> <p>--Purdue University: Reliability Risk Management of Gold Contaminated Tin-Lead and Lead-Free Solder Joints in Military Electronics</p> <p>--Texas A&M University: Propellant Formulations for Suppressing Combustion Instability in Solid Rocket Motors</p> <p>--Texas A&M University: Hysteresis Engineering of Adaptive Materials for Electronic and Opto-Electric Devices</p> <p>--University of Michigan: Narrow-Band Infrared Spectral Filtering via Silicon Sub-Wavelength Dielectric Gratings</p> <p>--Washington State University: Reliability of Through Silicon Vias and Solder Microbumps in 3D Electronics for High Performance Defense Applications</p> <p>-Sponsor breakthrough technology and innovative solutions from private industry, qualified accredited domestic educational institutions, and nonprofit organizations, using the Advanced Technology Innovation Broad Agency Announcement, to include research in:</p> <ul style="list-style-type: none"> -- Radar Systems -- Directed Energy Systems -- Electro-Optical Infrared Sensor Systems -- Computer Science, Signal, and Data Processing -- Mechanical and Aerospace engineering -- Decision Theory -- Modeling & Simulation -- Interceptor Technology -- Sensor Technology <p>-Continue an International Cooperative Agreement between the DoD and the Ministry of Defense of the Kingdom of Denmark concerning radar technology for ballistic missile defense applications</p> <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> -Partner with industry, universities and national laboratories through advanced technology initiatives to develop improvements, including: --Additive manufacturing technology initiatives for interceptor propulsion and structural components --Space & Sensor technology 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603180C / <i>Advanced Research</i>	Project (Number/Name) MD25 / <i>Advanced Technology Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> ---Continue radiation hardened mirror technology ---Continue radiation hardened strained-layer superlattice focal plane arrays ---Radiation insensitive electronics ---4D carbon-carbon manufacturing process addressing obsolescence issue ---Next generation seeker window development ---Deep learning algorithms for missile discrimination --Directed energy technology ---High power optical fibers ---Quick recovery high energy diodes ---Ultra low size weight and power diode pump modules ---Large stroke, high spatial bandwidth, deformable mirrors ---Light weight, dampened optical benches ---Optics and coatings for alkali environments --Interceptor technology ---Domestic source aerospace-grade Rayon replacement technology ---High power and energy density batteries ---High temperature and radiation hardened electronics ---Design criteria for stable bipropellant combustion ---Navigation algorithm technology development ---Propellants ---Multifunctional structures ---Thermal management ---Electro-optics --Future Ballistic Missile Defense System concept development ---Advanced sensor algorithm initiative ---Aerospace vehicle target, tracking, and discrimination ---Radar interferometric processing for electromagnetic rail gun --3D Printing of diamond composite structures -Nanosat Testbed Initiative: providing risk reduction in the development of new and advanced technologies, in support of the Ballistic Missile Defense System, by testing and demonstrating capabilities under realistic environmental conditions --CubeSat Networked Communications Experiments demonstrate notional Multi Object Kill Vehicle (MOKV) communications CONOPS --CubeSat Based Laser Communications Network demonstrate low-latency crosslink in a low-size, weight and power configuration 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603180C / <i>Advanced Research</i>	Project (Number/Name) MD25 / <i>Advanced Technology Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019
<p>-Hypersonic Component Testbed Initiative: Block 1: develop the testbed to understand capabilities of materials and components in a hypersonic environment</p> <p>-Suborbital Flight Test Program: reduce risk using sounding rockets to flight test and demonstrate interceptor and kill vehicle technology</p> <p>-Pursue on-going scientific and engineering university research initiatives and projects, including:</p> <ul style="list-style-type: none"> -- Auburn University: Survivability of Flexible Hybrid Electronics in Missile Applications -- Johns Hopkins University: Improvements in Thermal Battery Capabilities -- North Carolina State University/Czech Tech University: Space Debris Exploration: Modeling and Fusion Algorithms -- Penn State University: Development of High Performance W-Based Alloys with Sub-Grained Microstructure by Field Assisted Sintering Technology for Rocket Nozzles -- Purdue University: Investigation of Root Causes of Combustion Instability -- Purdue University: Reliability Risk Management of Gold Contaminated Tin-Lead and Lead-Free Solder Joints in Military Electronics -- Texas A&M University: Hysteresis Engineering of Adaptive Materials for Electronic and Opto-Electric Devices -- University of Michigan: Narrow-Band Infrared Spectral Filtering via Silicon Sub-Wavelength Dielectric Gratings -- U.S. Air Force Academy: Interceptor Flight Control Mechanism Efficiency <p>-Sponsor breakthrough technology and innovative solutions from private industry, qualified accredited domestic educational institutions, and nonprofit organizations, using the Advanced Technology Innovation Broad Agency Announcement, to include research in:</p> <ul style="list-style-type: none"> -- Radar Systems -- Directed Energy Systems -- Electro-Optical Infrared Sensor Systems -- Computer Science, Signal, and Data Processing -- Mechanical and Aerospace engineering -- Left and right of launch integration -- Decision Theory -- Modeling & Simulation -- Interceptor Technology 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603180C / <i>Advanced Research</i>	Project (Number/Name) MD25 / <i>Advanced Technology Development</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018		FY 2019
-- Sensor Technology				
FY 2018 to FY 2019 Increase/Decrease Statement: N/A				
Accomplishments/Planned Programs Subtotals	26.364	19.302		19.461

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603176C: <i>Advanced Concepts and Performance Assessment</i>	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
• 0603178C: <i>Weapons Technology</i>	47.403	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603294C: <i>Common Kill Vehicle Technology</i>	54.395	252.879	189.753	-	189.753	205.645	254.130	122.494	52.373	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy to conduct these technology development agreements consists of partnering with accredited domestic universities, small businesses, and nonprofit organizations. MDA awards competitive procurements via the MDA Science and Technology Advanced Research Broad Agency Announcement; the Advanced Technology Innovation Broad Agency Announcement; the Small Business Innovation Research program; and the Small Business Technology Transfer program.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603180C / <i>Advanced Research</i>				Project (Number/Name) MD40 / <i>Program-Wide Support</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	0.926	0.821	0.882	0.904	-	0.904	0.930	0.955	1.009	1.003	Continuing	Continuing

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603274C I <i>Special Program - MDA Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	183.208	12.509	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	195.717
MD81: <i>Special Programs - MDA Technology</i>	183.208	12.509	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	195.717

Program MDAP/MAIS Code: 362

Note

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

B. Program Change Summary (\$ in Millions)

	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>
Previous President's Budget	83.745	0.000	0.000	-	0.000
Current President's Budget	12.509	0.000	0.000	-	0.000
Total Adjustments	-71.236	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-71.950	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	1.000	0.000			
• SBIR/STTR Transfer	-0.286	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603294C / <i>Common Kill Vehicle Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	149.976	54.395	252.879	189.753	-	189.753	205.645	254.130	122.494	52.373	Continuing	Continuing
MD85: <i>Common Kill Vehicle Technology</i>	149.976	51.133	249.915	181.248	-	181.248	195.924	242.675	116.791	50.000	Continuing	Continuing
MD40: <i>Program Wide Support</i>	-	3.262	2.964	8.505	-	8.505	9.721	11.455	5.703	2.373	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

All FY 2017 Multi Object Kill Vehicle (MOKV) efforts were requested in the BA-4 0604894C Program Element. Beginning in FY 2018, MOKV Technology Risk Reduction efforts are requested in the BA-3 Common Kill Vehicle Technology program element 0603294C; MOKV product development is requested in the BA-4 Multi Object Kill Vehicle program element 0604894C.

A. Mission Description and Budget Item Justification

The Multi Object Kill Vehicle program will enhance interceptor performance to enable the Warfighter to counter more numerous and complex threats to the homeland by establishing the technological foundation for engaging multiple objects from a single interceptor. The Missile Defense Agency (MDA) is developing the concepts for an MOKV based on a modular, open systems architecture designed to common interfaces and standards, making upgrades easier and broadening MDA's vendor and supplier base.

The MOKV will rely on a Ballistic Missile Defense System (BMDS) architecture that balances performance across the sensor, Command, Control, Battle Management and Communications (C2BMC), and kill vehicle elements. Analysis shows that having multiple kill vehicles on each interceptor can dramatically improve the performance of the system, significantly reduce the burden on interceptor inventory, and reduce cost to defend the Homeland.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603294C / <i>Common Kill Vehicle Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	252.879	321.175	-	321.175
Current President's Budget	54.395	252.879	189.753	-	189.753
Total Adjustments	54.395	0.000	-131.422	-	-131.422
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	56.513	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.829	0.000			
• SBIR/STTR Transfer	-1.289	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-131.422	-	-131.422

Change Summary Explanation

The increase in FY 2017 from PB 2018 to PB 2019 reflects funds for MOKV requested in the Multi Object Kill Vehicle Program Element (0604894C) and appropriated in the Common Kill Vehicle Technology Program Element (0603294C).

The decrease in FY 2019 from PB 2018 to PB 2019 reflects delaying planned acceleration of kill vehicle and carrier vehicle component risk reduction as well as interoperability hardware-in-the-loop laboratory demonstrations.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3					R-1 Program Element (Number/Name) PE 0603294C / <i>Common Kill Vehicle Technology</i>				Project (Number/Name) MD85 / <i>Common Kill Vehicle Technology</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD85: <i>Common Kill Vehicle Technology</i>	149.976	51.133	249.915	181.248	-	181.248	195.924	242.675	116.791	50.000	Continuing	Continuing

Note

N/A

A. Mission Description and Budget Item Justification

In FY 2019, MDA will focus on Multi Object Kill Vehicle (MOKV) competitive Technology Risk Reduction with industry.

MDA has implemented a structured, disciplined systems engineering process to assure the MOKV is a Ballistic Missile Defense System (BMDS) solution. The systems engineering effort will define; the requirements for a deployable MOKV, the exit requirements for the technology component and subsystem risk reduction phase; and the entrance criteria for a future development phase. The Government will develop MOKV system engineering guidelines from industry concepts, government analysis, modeling, and simulation. The MOKV concepts and identified technology component risk reduction will formulate the trade space across cost, risk, and kill vehicle performance to establish requirements that are feasible and affordable for the engineering, manufacturing and development of a future MOKV. MDA anticipates deploying this capability across the interceptor fleet in the next decade to address the evolving threat.

As part of MOKV concept development, industry identified technology component risk reduction efforts that support their concepts. In FY 2019, MDA will continue risk reduction for selected kill vehicle and carrier vehicle component and subsystem technologies that lower development risk, leading to follow-on interoperability hardware-in-the loop laboratory demonstrations. MOKV technology risk reduction efforts include engagement management, communications, seekers and advanced sensors, divert attitude and control systems, integrated avionics, and inertial measurement units.

As part of further enhancing MOKV component risk reduction, kill vehicle and carrier vehicle subsystems will be matured together to conduct interoperability hardware-in-the-loop laboratory demonstrations of performance, functionality and interfaces.

A number of components will be integrated into the kill vehicle demonstrations to show operating functions and performance against simulated threats. Avionics will demonstrate relevant through put and navigation accuracy. Seeker telescope and sensor packaging will confirm frame rate speed, and achieve pixel density and sensitivity to acquire and track threat objects. Communication and antenna packaging will indicate transmission power and receiver sensitivity sufficiency, in conjunction with the viewing angles that will be encountered in an operational environment. Divert and attitude control system will demonstrate the thrust and divert capabilities that are necessary, in conjunction with seeker packaging and performance, to perform lethal engagements against a designated threat object.

An interoperability demonstration for the carrier vehicle, on which the kill vehicles will reside, will integrate an adjunct seeker telescope and sensor components to show larger format focal plane array sensitivity for object detection. Communication and real time engagement management operations will be tested to establish capabilities to optimally manage threat object identification and hand off target assignments to the kill vehicles.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603294C / <i>Common Kill Vehicle Technology</i>	Project (Number/Name) MD85 / <i>Common Kill Vehicle Technology</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2017	FY 2018	FY 2019
<p>Title: Common Kill Vehicle</p> <p>Description: Competitive Technology Risk Reduction of MOKV concepts with industry. In FY 2019, funding for MOKV Technology Risk Reduction is requested in this BA-3 Common Kill Vehicle Technology program element 0603294C and the MOKV development is requested in the BA-4 Multi Object Kill Vehicle program element 0604894C.</p> <ul style="list-style-type: none"> - Conduct technology risk reduction for selected component and subsystem technologies that lower development risk. Potential candidate MOKV technology risk reduction efforts include engagement management, kill vehicle-to-kill vehicle communications, advanced sensor, propulsion systems, and inertial measurement units - Refine and update government MOKV concepts for independent performance predictions via government simulations to establish baseline for contractor concept assessments - Continue development of MOKV engagement management algorithms to analyze and characterize government concepts for managing the many-on-many engagement challenges due to complex threats - Conduct independent engagement management test framework to test and analyze industry concept performance, identify algorithm risk issues, confirm risk reduction progress, and enable continued Agency's MOKV requirements development - Continue to build, assemble, and test initial inertial measurement unit prototype to support final design, prototype fabrication, and model validation - Conduct planning for integrated demonstration test events focused on critical functions to validate reduction of technical risk - Define the requirements for a deployable MOKV using a structured, disciplined systems engineering process <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The decrease from FY 2018 to FY 2019 reflects delaying planned acceleration of kill vehicle and carrier vehicle component risk reduction as well as kill vehicle and carrier vehicle interoperability hardware-in-the-loop laboratory demonstrations.</p>	51.133	249.915	181.248
Accomplishments/Planned Programs Subtotals	51.133	249.915	181.248

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603294C / <i>Common Kill Vehicle Technology</i>	Project (Number/Name) MD85 / <i>Common Kill Vehicle Technology</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603176C: <i>Advanced Concepts and Performance Assessment</i>	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
• 0603178C: <i>Weapons Technology</i>	47.403	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603180C: <i>Advanced Research</i>	27.185	20.184	20.365	-	20.365	20.778	21.194	21.652	22.036	Continuing	Continuing
• 0604894C: <i>Multi Object Kill Vehicle</i>	0.000	6.500	8.256	-	8.256	33.935	8.277	184.118	355.060	0.000	596.146

Remarks

D. Acquisition Strategy

The acquisition strategy consists of three focus areas. First, through competition with missile integration contractors, develop kill vehicle architectures and interfaces with competitive design of multi object kill concepts incorporating engagement management concept of operations, kill vehicles and enhanced discrimination capability. Second, conduct risk reduction activities to identify and mature the technology necessary to increase the reliability and performance of our kill vehicles using the Advanced Technology Innovation Broad Agency Announcement and competitive procurements. Make investments that mitigate the component development gaps for future Multi Object Kill Vehicles, and enhance the competitive environment. Make the necessary investments to maturing component technology; enhanced inertial navigation and kill vehicle-to-kill vehicle communications. Third, leverage the technical expertise of Federally Funded Research and Development Centers, University Applied Research Centers, and Universities and government laboratories to independently develop reference concept using proven modeling/analysis techniques.

E. Performance Metrics

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603294C / <i>Common Kill Vehicle Technology</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program Wide Support</i>	-	3.262	2.964	8.505	-	8.505	9.721	11.455	5.703	2.373	Continuing	Continuing

Note
N/A

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions)

Title: Program Wide Support	FY 2017	FY 2018	FY 2019
Description: N/A	3.262	2.964	8.505
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	3.262	2.964	8.505

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603294C / <i>Common Kill Vehicle Technology</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603294C / <i>Common Kill Vehicle Technology</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AK, AL, CA, CO, VA	0.000	0.942	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services.	C/CPFF	Various : Multi: AL, VA	0.000	2.320	Nov 2016	2.964	Nov 2017	8.505	Nov 2018	-		8.505	Continuing	Continuing	Continuing
Subtotal			0.000	3.262		2.964		8.505		-		8.505	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	3.262	2.964	8.505	-	8.505	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,339.241	197.171	292.262	214.173	-	214.173	199.399	197.451	174.161	152.174	Continuing	Continuing
MD07: <i>THAAD</i>	1,254.368	182.901	277.669	198.132	-	198.132	178.852	176.785	157.140	139.393	Continuing	Continuing
MC07: <i>Cyber Operations</i>	1.760	3.694	3.325	6.149	-	6.149	9.583	10.584	7.612	4.186	Continuing	Continuing
MD06: <i>Patriot Advanced Capability-3 (PAC-3)</i>	7.552	1.083	1.162	1.159	-	1.159	1.244	1.228	1.252	1.288	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	75.561	9.493	10.106	8.733	-	8.733	9.720	8.854	8.157	7.307	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The decrease from FY 2018 to FY 2019 reflects completion of the United States Forces Korea (USFK) Joint Emergent Operational Need Statement (JEON) Phases 1-3 activities in FY 2019. There is also a decrease in development effort required for THAAD software build 4.0, the continued incremental transition of software support to O&M funding and the completion of Debris Mitigation Phase 2 development in FY 2018.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$62.100 Million is required to fund Phase 1, 2 and 3 efforts for emergency warfighting requirements in support of USFK JEON.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense (BMD) Terminal Defense Segment provides vital forward-deployable capabilities to support Regional defensive BMD operations. The Terminal High Altitude Area Defense (THAAD) system provides Combatant Commanders a globally-transportable, rapidly-deployable capability to intercept and destroy short-range, medium-range, and limited intermediate-range ballistic missile threats inside or outside the atmosphere during terminal phase of flight. Continued development and integration will provide enhanced debris mitigation capability, improved interoperability with other BMDS elements, and training devices to support the THAAD Institutional Training Base.

This Program Element also investigates concepts and performs systems engineering to address emerging threats.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$62.100 Million is required to address emergency warfighting readiness requirements.

+\$62.100 Million Project MD07 THAAD: required to fund Phase 1, 2 and 3 efforts in the THAAD portion of USFK JEON to deliver enhanced capabilities against specific USFK threats as well expanded engagement options and increased coverage area.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	209.072	230.162	194.328	-	194.328
Current President's Budget	197.171	292.262	214.173	-	214.173
Total Adjustments	-11.901	62.100	19.845	-	19.845
• Congressional General Reductions	-5.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-4.663	0.000			
• FY 2017 Request for Additional Appropriations	-2.238	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	62.100	0.000	-	0.000
• Other Adjustment	0.000	0.000	19.845	-	19.845

Change Summary Explanation

The FY 2017 reduction of (\$4.663) for transfer to SBIR/STTR requirements.

The FY 2017 decrease of (\$2.238M) is due to the Cybersecurity Operations improvement activities for BMDS readiness not addressed in the RFAA 2017.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$62.100M is required to address emergency warfighting readiness requirements.

The increase of \$19.845M in FY 2019 from PB 2018 to PB 2019 is due to additional USFK JEON funding provided for Phases 1-3, offset by reductions due to elimination of THAAD Follow-on requirements.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD07: <i>THAAD</i>	1,254.368	182.901	277.669	198.132	-	198.132	178.852	176.785	157.140	139.393	Continuing	Continuing
Quantity of RDT&E Articles	50	-	-	-	-	-	-	-	-	-		

Note

The decrease from FY 2018 to FY 2019 reflects a decrease in development effort required for THAAD software build 4.0, the continued incremental transition of software support to O&M funding, completion of Debris Mitigation Phase 2 development in FY 2018, and the transfer of cybersecurity development requirements to the MC07: Cyber Operations budget project. There is also a decrease from FY 2018 to FY 2019 which reflects completion of Prime Contractor software development efforts, and OGA testing, in support of USFK JEON.

A. Mission Description and Budget Item Justification

The THAAD II Development Program consists of multiple, independent software builds (e.g. Build 2.0, Build 3.0, build 4.0, and build 5.0) to expand the capability of the previously delivered THAAD 1.0 system. THAAD software build 3.0 is scheduled to be completed in 3Q FY 2018. THAAD software build 4.0 is scheduled to be completed in 1Q FY 2021. THAAD software build 5.0 is scheduled to be completed in 2Q FY 2023.

New capabilities provided from the different software builds of the THAAD II Development Program include upgrades such as:

- 1) improved THAAD Weapons System performance in the presence of a high debris environment,
- 2) expanded defended area footprints via remote operation of THAAD Launchers,
- 3) accelerated Remoted Launcher activities in support of USFK JEON,
- 4) exploitation of a performance capability and Regional Engagement Coordination Software upgrades in support of USFK JEON,
- 5) enhancements to share defended assets between BMD tactical level weapon systems,
- 6) software upgrades to maintain capability against evolving threats,
- 7) upgrades to process C2BMC messages to obtain direction for target engagement,
- 8) Weapon System Information Assurance mandatory updates,
- 9) Warfighter requested enhancements,
- 10) improved capability to engage SRBM, MRBM and limited IRBM threats capable of creating complex scenes,
- 11) upgrades to maintain interfaces with other BMDS elements, and
- 12) providing the ability to initiate an engagement and launch THAAD interceptors using sensor data provided by BMDS sources outside the THAAD Battery.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Terminal High Altitude Area Defense (THAAD) Development	125.182	163.006	119.962
Articles:	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

Description: Development of the THAAD II program as a series of independent, parallel software builds (e.g. Build 2.0, Build 3.0, build 4.0, and build 5.0) to deliver enhanced system capabilities and expand defense of allies and deployed forces from short-to-medium-range threats.

Recurring efforts to support software development include:

- Support Models and Simulations (M&S) related activities in element and BMDS test events in the approved Integrated master Test Plan (IMTP) such as; requirements, design, development, and verification/validation and accreditation,
- Design, develop, test, and field the releases of THAAD system software to ensure continued performance and operation of fielded batteries,
- Provide software updates in support of performance upgrades,
- Support laboratory assets and equipment to enable future development, and to isolate, identify, and remedy root causes of equipment and software deficiencies identified by the warfighter,
- Perform requirements development, engineering analysis, and performance verification for THAAD development and BMDS integration to ensure THAAD compliance with the Ballistic Missile Defense (BMD) System Specification, BMD System Description Document, and Master Integration Plan,
- Participate in MDA and Army studies to determine the architecture and integration of the THAAD Weapon system into the Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS), and
- Provide and coordinate analysis, studies and papers to support the resolution of issues and concerns with the integration of the THAAD weapon system into the future Army IBCS architecture.
- Development for THAAD Electronic Protection/Objective Debris Mitigation and implementation of flexible-threat packages and defense planning in order to provide an improved capability to engage SRBM, MRBM and limited IRBM threats capable of creating complex scenes.
- Development of expanded defended area footprints via remote operation of THAAD Launchers. This effort adds additional communication pathways between launchers and TFCC to allow launchers to be emplaced.
- Development of improved tactical network architecture in order to increase availability, robustness, and security of the system to counter cybersecurity threats.
- Block Development Process to identify THAAD evolution and synchronize requirements that address threat evolution, obsolescence needs, Army training needs, reliability and sustainment issues. Perform redesign mitigation for obsolescence which could impact THAAD's future capability evolution.

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:

FY 2017	FY 2018	FY 2019

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Complete development of Phase II debris mitigation functionality and integration into the weapon system to improve interoperability with other BMDS elements - Continue development for THAAD Electronic Protection/Objective Debris Mitigation and implementation of flexible-threat packages and defense planning in order to provide an improved capability to engage SRBM, MRBM and limited IRBM threats capable of creating complex scenes. - Continue analysis of potential enhancements to Regional Peer-to-Peer Engagement Coordination between BMD tactical level weapon systems that share defended assets and are capable of engaging a common threat to conserve missile inventory and maximize engagements. - Continue acquisition and upgrades to test beds to support software development, cyber security efforts, and changes to hardware configuration. - Continue the incremental transition of software support from the Prime Contractor to organic support in order to reduce total system life cycle costs. - Continue mitigation of Track ID Proliferation to improve situational awareness when the warfighter is presented target information from multiple BMDS sensors. - Complete the development and coordination of the THAAD Portable Planner into Step 1 of the IBCS architecture to enable integration of the THAAD battery capability into the IBCS battle planning process in order to expand interoperability with air and missile defense systems. - Initiate Block Development Process to identify THAAD evolution and synchronize requirements that address threat evolution, obsolescence needs, Army training needs, reliability and sustainment issues. Perform redesign mitigation for obsolescence which could impact THAAD's future capability evolution. - Conduct studies to assist in identification of concepts and solutions to interceptors, sensors, and command and control to close potential THAAD capability gaps in order to provide enhanced defense against emerging regional threats. - Initiate developmental efforts to replace current GPS antennas with anti-jam and regional clock capabilities. This effort is a Department of Defense mandate to ensure the integrity and availability of positioning, navigation, and timing data for the THAAD weapon system. <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Complete the incremental transition of software support from the Prime Contractor to organic support in order to reduce total system life cycle costs. - Complete mitigation of Track ID Proliferation to correctly associate track objects when the objects are tracked by multiple BMDS sensors. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Complete developmental efforts to replace current GPS antennas with anti-jam and regional clock capabilities. This effort is a Department of Defense mandate to ensure the integrity and availability of positioning, navigation, and timing data for the THAAD weapon system</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The decrease from FY 2018 to FY 2019 reflects a decrease in development effort required for THAAD software build 4.0, the continued incremental transition of software support to O&M funding, completion of Debris Mitigation Phase 2 development in FY 2018, and the transfer of cyber security development requirements to the MC07: Cyber Operations budget project.</p>				
<p>Title: Program Operations</p> <p align="right">Articles:</p> <p>Description: Program Operations provides strategic planning, program integration, contracting, acquisition, engineering, financial management, internal reviews and audits, and program assessments for the THAAD Program Office.</p> <p>Recurring activities include:</p> <ul style="list-style-type: none"> -Provide technical and business management support activities to provide the Program Director with critical program status and decision quality data, -Ensure THAAD program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process, -Conduct internal Baseline Execution Reviews to measure program progress against the six Missile Defense Agency approved baselines -Continue a Mission Assurance and Manufacturing Engineering Program to include Quality, Configuration Management, Manufacturing, Engineering, and Safety in all phases of the system life cycle, throughout the supply chain, and at all levels of assembly emphasizing high yield rates which minimize test and rework costs, and -Provide Quality Safety and Mission Assurance (QSMA) operations to ensure compliance with Agency requirements for design, test, manufacturing, quality, safety and reliability to ensure high quality products are delivered to the Warfighter. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p>		47.450	45.704	50.930
		-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
The increase from FY 2018 to FY 2019 reflects fully funding the required manpower to meet mission requirements resulting from increased production and deployments.			
<p>Title: USFK JEON</p> <p align="right">Articles:</p> <p>Description: This accomplishment includes the THAAD portion of USFK JEON to deliver expanded engagement options and increased coverage area. This includes accelerating some content previously included in the THAAD Development accomplishment, while adding new development efforts such as improved power system for THAAD batteries to improve reliability and availability.</p> <p>Phase 1: Provides enhanced THAAD capability against specific USFK threats as well improved radar energy allocation to lower priority assets without losing coverage of higher priority assets. Phase 2: Improve THAAD Debris Mitigation through software updates to improve performance against debris. Phase 3: Provides an accelerated initial capability to remote launchers to increase defended area and support occupation of additional sites. Phase 3 also provides additional capability against threats in complex environments.</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Completes the accelerated development of an initial capability against electronic threats to the THAAD Weapon System. This capability encompasses software changes in both the TFCC and the ANTPY-2 radar to deliver the improved performance. - Continues acquisition of testbeds required to support USFK JEON development efforts. - Continues upgrading testbeds and laboratories to reflect current and future hardware configurations of the THAAD Weapon Systems to support the JEON development and testing. - Completes development and coordination of a plan with the Operational Test Agency to identify data required to support a US Army Urgent Materiel Release decision for the THAAD Phase 3 content of the USFK JEON plan. - Initiates development of an improved and more reliable on-board vehicle power solution to support of the USFK JEON effort. <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Completes accelerated development of the THAAD Launcher emplacement in support of the USFK JEON effort. Remote operation of the THAAD Launchers provide a mitigation against advanced threat ballistic missiles, expands defended area footprints, and enables emplacement in restricted terrain locations. - Completes acquisition of testbeds required to support USFK JEON development efforts. - Completes upgrading testbeds and laboratories to reflect current and future hardware configurations of the THAAD Weapon Systems to support the JEON development and testing. 	0.000	62.100	20.200
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Completes development of an improved and more reliable on-board vehicle power solution to support of the USFK JEON effort. This on-board power solution will increase reliability and availability to all THAAD components.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The decrease from FY 2018 to FY 2019 reflects the completion of electronic protection improvements and materiel release planning in FY 2018, as well as a decrease in development effort required for remote launcher operations, system power architecture improvements and testbed acquisitions.</p>				
<p>Title: Project Redwood- Details at a Higher Classification</p> <p align="right">Articles:</p> <p>Description: This project is reported in accordance with Title 10, United States Code, Section 119 (a)(1) in the Special Access Program Annual Report to Congress.</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>		4.074 -	4.283 -	4.356 -
<p>Title: THAAD Program Support</p> <p align="right">Articles:</p> <p>Description: This activity provides support for efforts such as communications and interoperability upgrades to operate on joint, service, or allied communications networks. This activity provides support for safety and mission assurance requirements, and support of independent government offices as part of the Materiel Release process.</p> <p>Recurring efforts include: - Interoperability development and maintenance to ensure the weapon system is authorized to operate on joint, service, or allied communications networks, and - Safety confirmation and verification testing, preparation and approvals of System Safety Risk Assessments, issuance of hazard classifications and safety releases, insensitive munitions approvals and waivers, and independent oversight and support in the areas of reliability, availability, and maintainability (RAM) and quality assurance.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p>		6.195 -	2.576 -	2.684 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<i>FY 2018 Plans:</i> - SEE ABOVE.			
<i>FY 2019 Plans:</i> - SEE ABOVE.			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> N/A			
Accomplishments/Planned Programs Subtotals	182.901	277.669	198.132

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0208866C: MD07: <i>THAAD O&M</i>	72.099	78.761	92.608	-	92.608	98.370	91.579	92.643	94.366	Continuing	Continuing
• 0208866C: MD07: <i>THAAD Procurement</i>	566.504	960.732	469.068	-	469.068	416.343	413.956	424.473	434.439	232.135	3,917.650
• 0604876C: <i>Ballistic</i> <i>Missile Defense Terminal</i> <i>Defense Segment Test</i>	57.567	36.239	61.017	-	61.017	16.917	49.170	51.003	59.759	Continuing	Continuing

Remarks

D. Acquisition Strategy

The THAAD program awards Indefinite Delivery Indefinite Quantity (IDIQ) Task Orders on the Advanced Capability Development (ACD) contract for THAAD 2.0 development. The ACD contract is comprised of over 40 separate task orders with varying contract types such as firm fixed price, fixed price incentive firm, cost plus incentive fee, and cost plus fixed fee. The discrete task orders allow management and tracking of Development work.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Terminal High Altitude Area Defense (THAAD) Development - Advanced Capability Development	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	637.961	76.565	Oct 2016	125.621	Nov 2017	82.135	Nov 2018	-		82.135	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - IT Program Support	C/CPAF	Northrup Grumman : AL, AK, CA, CO, HI, NM, VA	2.306	2.149	Oct 2016	2.952	Nov 2017	3.158	Jan 2019	-		3.158	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Lockheed Martin	SS/CPFF	LMSSC : Sunnyvale, CA/Huntsville, AL	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
Terminal High Altitude Area Defense (THAAD) Development - MDA Program Support	MIPR	Missile Defense Agency (MDA) : Ft. Belvoir, VA/ Huntsville, AL	0.000	7.890		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Models & Simulations	MIPR	US Army Research, Development, Engineering Command (RDECOM) : Huntsville, AL	173.155	23.855	Oct 2016	23.527	Dec 2017	22.195	Dec 2018	-		22.195	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Requirements and Design	C/CPAF	Boeing : AL	10.419	1.153	Dec 2016	2.817	Dec 2017	4.710	Dec 2018	-		4.710	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Software Support (GOVT)	MIPR	US Army Research, Development, Engineering Command (RDECOM) : Huntsville, AL	2.097	2.359		6.313	Nov 2017	5.692	Nov 2018	-		5.692	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD)	SS/CPAF	Raytheon : MA	0.000	10.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development - THAAD Radar Improvements															
Terminal High Altitude Area Defense (THAAD) Development - Verification and Assessment	C/CPFF	TEAMS SE&I : AL / CO	10.021	1.211	Dec 2016	1.776	Dec 2017	2.072	Dec 2018	-		2.072	Continuing	Continuing	Continuing
USFK JEON - JEON Advanced Capability Development	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	0.000	0.000		52.419	Mar 2018	18.480	Dec 2018	-		18.480	0.000	70.899	0.000
USFK JEON - OGA JEON Support (GOVT)	MIPR	US Army Tank Automotive Research, Development, and Engineering Center (TARDEC), Army Test and Evaluation Command (ATEC) : Warren, MI / Huntsville, AL	0.000	0.000		9.681	Jun 2018	1.720	Dec 2018	-		1.720	0.000	11.401	0.000
Subtotal			835.959	125.182		225.106		140.162		-		140.162	Continuing	Continuing	N/A

Remarks

- Award dates are shown as October as they are the continuation of task orders or MIPRs from previous FYs.

- The decrease in Advanced Capability Development (ACD) from FY 2018 to FY 2019 reflects a decrease in the development effort required for THAAD software build 4.0, the continued incremental transition of software support to O&M funding, completion of Debris Mitigation Phase 2 development in FY 2018, and the transfer of cyber security development requirements to the MC07: Cyber Operations budget project. The ACD contract is comprised of over 40 separate task orders with varying contract types such as firm fixed price, fixed price incentive firm, cost plus incentive fee, and cost plus fixed fee. - The addition of R-3 Cost Category Item "Software Support (GOVT)" in FY 2018 is the incremental transition of software support from the Prime Contractor to AMRDEC to reduce total system life cycle costs.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Operations - Program Operations	Various	Missile Defense Agency (MDA) : Ft. Belvoir, VA / Huntsville, AL	189.523	47.450	Oct 2016	45.704	Oct 2017	50.930	Oct 2018	-		50.930	Continuing	Continuing	Continuing
Project Redwood- Details at a Higher Classification - Special Programs	SS/FP	N/A : N/A	73.087	4.074	Oct 2016	4.283	Oct 2017	4.356	Oct 2018	-		4.356	Continuing	Continuing	Continuing
THAAD Program Support - Mission Support	MIPR	ATEC / SMDC / AMRDEC / MDA : WSMR, NM / Huntsville, AL	18.620	6.195	Oct 2016	2.576	Nov 2017	2.684		-		2.684	Continuing	Continuing	Continuing
THAAD Program Support - Prime Contractor Support	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	0.600	0.000		0.000		0.000		-		0.000	0.000	0.600	0.000
THAAD Program Support - Prior year no longer funded in the FYDP	Various	Various : Various	136.579	0.000		0.000		0.000		-		0.000	0.000	136.579	0.000
Subtotal			418.409	57.719		52.563		57.970		-		57.970	Continuing	Continuing	N/A

Remarks
- Award dates are shown as October as they are the continuation of task orders or MIPRs from previous FYs.

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,254.368	182.901	277.669	198.132	-	198.132	Continuing	Continuing	N/A

Remarks
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>
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	Significant Event Complete ▲		Milestone Decision Complete ★		Element Test Complete ◆		System Level Test Complete ●		Complete Activity ◆																					
	Significant Event Planned △		Milestone Decision Planned ☆		Element Test Planned ◇		System Level Test Planned ○		Planned Activity ◇																					
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023											
THAAD Software Build 4.0 Engineering Requirements Review (ERR)																														
THAAD Software Build 4.0 Preliminary Design Review (PDR)																														
THAAD Software Build 4.0 Engineering Design Review (EDR)																														
THAAD Software Build 3.0 Delivery (including USFK JEON Phase 2)																														
THAAD Software Build 5.0 Engineering Requirements Review (ERR)																														
THAAD Software Build 3.2 (USFK JEON Phase 3)																														
THAAD Software Build 4.0 Delivery																														
THAAD Software Build 5.0 Delivery																														

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD07 / <i>THAAD</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
THAAD Software Build 4.0 Engineering Requirements Review (ERR)	4	2017	4	2017
THAAD Software Build 4.0 Preliminary Design Review (PDR)	1	2018	1	2018
THAAD Software Build 4.0 Engineering Design Review (EDR)	3	2018	3	2018
THAAD Software Build 3.0 Delivery (including USFK JEON Phase 2)	4	2018	4	2018
THAAD Software Build 5.0 Engineering Requirements Review (ERR)	4	2018	4	2018
THAAD Software Build 3.2 (USFK JEON Phase 3)	4	2019	4	2019
THAAD Software Build 4.0 Delivery	1	2021	1	2021
THAAD Software Build 5.0 Delivery	2	2023	2	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MC07 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC07: <i>Cyber Operations</i>	1.760	3.694	3.325	6.149	-	6.149	9.583	10.584	7.612	4.186	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The increase from FY 2018 to FY 2019 reflects the movement of cyber security requirements for software development efforts being moved from R2a "THAAD Development" in the MD07 budget project to better align with cyber security funding breakout.

A. Mission Description and Budget Item Justification

Cyber Operations sustain MDA Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities; analysis of validation results, risk assessments; reviews of proposed Program Manager/Information Assurance Manager Plans of Action and Milestones for MDA THAAD mission systems; and supports THAAD certification to operate in the BMDS.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Network / System Certification and Accreditation (C&A)	3.694	3.325	6.149
Articles:	-	-	-
<p>Description: Funding in this project sustains MDA RMF and CVT activities, analysis of validation results, risk assessments, monitoring and tracking of Cybersecurity mitigations, and all other activities necessary to comply with the Federal Information Security Management Act (FISMA).</p> <p>Recurring efforts include:</p> <ul style="list-style-type: none"> - Conducting cyber security / information assurance engineering and architecture planning for THAAD information technology systems - Developing and testing cyber security/information assurance control measures for BMDS THAAD systems - Developing THAAD RMF for DoD IT certification and accreditation packages - Supporting CVT of THAAD mission, test, and training systems - Developing Plan of Action and Milestones (POA&Ms) to resource and remediate information assurance deficiencies - Conducting annual information assurance reviews on the THAAD enclaves to assess compliance in implementing and maintaining IA controls - Perform IAVA to mitigate potential system vulnerabilities - Update THAAD software and hardware to ensure compliance with DoD Weapon System Information Assurance Programs <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MC07 / <i>Cyber Operations</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- SEE ABOVE			
<i>FY 2019 Plans:</i> - Continue THAAD Weapon System software development efforts consistent with DoD cyber security requirements which were previously covered under THAAD Development, in order to correlate cyber software activities with realigned funding.			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> The increase from FY 2018 to FY 2019 reflects the movement of cyber security requirements for software development efforts being moved from R2a "THAAD Development" in the MD07 budget project to better align with cyber security funding breakout.			
Accomplishments/Planned Programs Subtotals	3.694	3.325	6.149

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0208866C: MD07: <i>THAAD O&M</i>	72.099	78.761	92.608	-	92.608	98.370	91.579	92.643	94.366	Continuing	Continuing
• 0208866C: MD07: <i>THAAD Procurement</i>	566.504	960.732	469.068	-	469.068	416.343	413.956	424.473	434.439	232.135	3,917.650
• 0604876C: <i>Ballistic</i> <i>Missile Defense Terminal</i> <i>Defense Segment Test</i>	57.567	36.239	61.017	-	61.017	16.917	49.170	51.003	59.759	Continuing	Continuing

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MC07 / <i>Cyber Operations</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network / System Certification and Accreditation (C&A) - CND/IA Advisory and Assistance Services	C/CPFF	Torch Technologies : Various MDA Locations	1.760	0.534	Oct 2016	0.678	Nov 2017	0.888	Nov 2018	-		0.888	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Security Engineering	SS/CPFF	LMSSC : Sunnyvale, CA/Huntsville, AL	0.000	3.160	Oct 2016	2.647	Jan 2018	5.261	Jan 2019	-		5.261	Continuing	Continuing	Continuing
Subtotal			1.760	3.694		3.325		6.149		-		6.149	Continuing	Continuing	N/A

Remarks
The increase in Security Engineering from FY 2018 to FY 2019 reflects the movement of cyber security requirements for software development efforts being moved from R2a "THAAD Development" in the MD07 budget project to better align with cyber security funding breakout.

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.760	3.694	3.325	6.149	-	6.149	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity
0400 / 4

R-1 Program Element (Number/Name)
PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*

Project (Number/Name)
MC07 / *Cyber Operations*

	◆	◇	●	◆	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇																			
Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆	Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																													
					FY 2017		FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023																
MC07 Completed Cyber Operations	◆	◆	◆	◆																																		
MC07 Planned Cyber Operations							◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MC07 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC07 Completed Cyber Operations	1	2017	1	2018
MC07 Planned Cyber Operations	2	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>				Project (Number/Name) MD06 / <i>Patriot Advanced Capability-3 (PAC-3)</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD06: <i>Patriot Advanced Capability-3 (PAC-3)</i>	7.552	1.083	1.162	1.159	-	1.159	1.244	1.228	1.252	1.288	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

A. Mission Description and Budget Item Justification

PAC-3 is an operational, land-based weapon built upon the proven U.S. Army Phased Array Tracking Radar Intercept on Target (PATRIOT) air and missile defense infrastructure. The Army is responsible for production and further development of the PAC-3 System; MDA remains responsible for any BMDS interoperability and integration efforts. Lower Tier Project Office (LTPO) will utilize MDA funds to further the integration of PATRIOT with the BMDS.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: General Support	1.083	1.162	1.159
Articles:	-	-	-
Description: MDA funds PATRIOT participation in BMDS interoperability integration efforts. Activities support the day-to-day tasking that is leveraged upon LTPO by MDA based on the Transfer and Transition Plan Annex L. Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans: - SEE ABOVE.			
FY 2019 Plans: - SEE ABOVE.			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	1.083	1.162	1.159

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD06 / <i>Patriot Advanced Capability-3 (PAC-3)</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0208866C: MD07: <i>THAAD O&M</i>	72.099	78.761	92.608	-	92.608	98.370	91.579	92.643	94.366	Continuing	Continuing
• 0208866C: MD07: <i>THAAD Procurement</i>	566.504	960.732	469.068	-	469.068	416.343	413.956	424.473	434.439	232.135	3,917.650
• 0604876C: <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	57.567	36.239	61.017	-	61.017	16.917	49.170	51.003	59.759	Continuing	Continuing

Remarks

D. Acquisition Strategy

The planned acquisition strategy for Phased Array Tracking Radar Intercept on Target (PATRIOT) support is to provide Military Interdepartmental Purchase Requests (MIPR) to the U.S. Army Lower-Tier Program Office (LTPO) to further the integration of PATRIOT with the BMDS.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD06 / <i>Patriot Advanced Capability-3 (PAC-3)</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
General Support - General Support	MIPR	Lower Tier Project Office : Huntsville, AL	7.552	1.083	Nov 2016	1.162	Nov 2017	1.159	Nov 2018	-		1.159	Continuing	Continuing	Continuing
Subtotal			7.552	1.083		1.162		1.159		-		1.159	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	7.552	1.083	1.162	1.159	-	1.159	Continuing	Continuing	N/A

Remarks
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD06 / <i>Patriot Advanced Capability-3 (PAC-3)</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																								
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																								
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	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023																					
MD06 Completed Patriot Advanced Capability-3 (PAC-3)	◆																											
MD06 Planned Patriot Advanced Capability-3 (PAC-3)		◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD06 / <i>Patriot Advanced Capability-3 (PAC-3)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD06 Completed Patriot Advanced Capability-3 (PAC-3)	1	2017	1	2017
MD06 Planned Patriot Advanced Capability-3 (PAC-3)	2	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	75.561	9.493	10.106	8.733	-	8.733	9.720	8.854	8.157	7.307	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
Program Wide Support reflects proportional changes as a result of budget changes in Ballistic Missile Defense Terminal Defense Segment program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA-wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	9.493	10.106	8.733
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	9.493	10.106	8.733

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various : VA	3.500	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	6.607	0.050	Jul 2017	0.202	Jul 2018	0.132	Jul 2019	-		0.132	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	C/CPAF	Various : Multi: AL, CA, CO, VA	2.795	0.720	Jul 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : MDA Multi: AL, CO, CA, VA,	14.049	0.000		0.000		0.550		-		0.550	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support International and Materiel and Readiness	MIPR	Various : Multi: AL, VA, Aust, Japan	1.929	0.605	Jul 2017	0.921	Jul 2018	0.037	Apr 2019	-		0.037	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	45.757	7.619	Jan 2017	8.983	Jan 2018	7.650	Aug 2019	-		7.650	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	Various : Multi: AL, VA	0.924	0.499	Aug 2017	0.000		0.364	Jan 2019	-		0.364	Continuing	Continuing	Continuing
Subtotal			75.561	9.493		10.106		8.733		-		8.733	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	75.561	9.493	10.106	8.733	-	8.733	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆														
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇														
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FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023												
◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇												
MD40 Program-Wide Support																		

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	3,641.701	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
MD08: <i>Ground Based Midcourse</i>	3,384.755	981.437	906.692	872.895	-	872.895	990.175	793.532	539.759	518.995	Continuing	Continuing
MC08: <i>Cyber Operations</i>	21.534	12.329	18.818	23.754	-	23.754	26.372	26.575	19.463	25.454	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	235.412	41.095	31.587	29.710	-	29.710	29.688	27.430	26.734	28.170	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2018 to FY 2019 reflects completion and delivery of Ground Based Interceptors (GBIs) 48-57 and completion of the preponderance of 2- or 3-Stage Selectable Booster Software development.

FY 2017 MISSILE DEFEAT ENHANCEMENT REPROGRAMMING (FY2017-26 PA): +\$81.000M is required to address emergency warfighting requirements in support of non-recurring engineering in advance of Procurement to begin an increase in capability of the Ground-based Interceptors (GBI) by 20 from 44 to 64 (\$72.0M) and to add 20 new silos in a new missile field in Fort Greely, AK (Missile Field #4) (\$9.0M). This is a congressional special interest item.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$129.00M is required to address emergency warfighter requirements by increasing the capacity of GBIs for the warfighter. Specific requirements include the acceleration of the Redesigned Kill Vehicle (RKV) development, the obsolescence redesign of the Configuration 2 (C2) Boost Vehicle to replace the inertial measurement unit, the All Up Round (AUR) systems engineering of the of the RKV/C2+ Ground Based Interceptor (GBI), and the mitigation of Missile Field 4 (MF-4) Obsolescence.

A. Mission Description and Budget Item Justification

The Ground-based Midcourse Defense (GMD) element of the Ballistic Missile Defense System (BMDS) provides combatant commanders with a continuously available (24 hours a day, 365 days a year) capability to defend the Homeland against limited Intercontinental Ballistic Missile (ICBM) attacks. The GMD capability consists of Ground Based Interceptors (GBI), GMD Fire Control system (GFC), GMD Communications Network (GCN), In-Flight Interceptor Communications System (IFICS) Data Terminal (IDT) and ground Launch Support Systems (LSS). The Missile Defense Agency (MDA) will deliver 64 operationally deployed GBIs located at Fort Greely, Alaska (60 GBIs) and Vandenberg Air Force Base, California (4 GBIs). Each GBI delivers a single kill vehicle to defeat threat warheads in space during the midcourse phase of the ballistic trajectory. The GFC consists of fire control nodes in Fort Greely, Alaska and Missile Defense Integration and Operations Center (MDIOC) Colorado Springs, Colorado. IDTs are currently located in Fort Greely, Alaska: Vandenberg Air Force Base, California; Eareckson Air Station, Alaska; and Fort Drum, New York. The GMD capability leverages integration of BMDS sensors across the globe. Development objectives for GMD include: improve homeland defensive capability against an evolving threat that is increasing both in number of missiles and complexity of threat payloads, execute flight testing, modernize the GMD ground system, provide fire control and communications, develop GBI software enhancements that improve reliability, capability, and discrimination, improve GMD models and simulations, and participate with other BMDS assets in system ground tests.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	862.080	828.097	630.842	-	630.842
Current President's Budget	1,034.861	957.097	926.359	-	926.359
Total Adjustments	172.781	129.000	295.517	-	295.517
• Congressional General Reductions	-5.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	110.700	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-13.919	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	81.000	129.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	295.517	-	295.517

Change Summary Explanation

The increase from PB18 to PB19 in FY 2019 reflects additional funding required to support fielding of 20 additional GBIs at Fort Greely, AK to include Missile Field 4 efforts, Ground Systems hardware/software upgrades and C2, booster obsolescence development and to ensure the number of fielded GBI's does not decrease through the FYDP. In addition, increased funding will address cybersecurity vulnerabilities and continue to improve discrimination capabilities.

FY 2017 MISSILE DEFEAT ENHANCEMENT REPROGRAMMING (FY2017-26 PA): +\$81.000M is required to address emergency warfighting requirements in support of non-recurring engineering in advance of Procurement to begin an increase in capability of the Ground-based Interceptors (GBI) by 20 from 44 to 64 (\$72.0M) and to add 20 new silos in a new missile field in Fort Greely, AK (Missile Field #4) (\$9.0M). This is a congressional special interest item.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$129.00M is required to address emergency warfighter requirements by increasing the capacity of GBIs for the warfighter. Specific requirements include the acceleration of the Redesigned Kill Vehicle (RKV) development, the obsolescence redesign of the Configuration 2 (C2) Boost Vehicle to replace the inertial measurement unit, the All Up Round (AUR) systems engineering of the of the RKV/C2+ Ground Based Interceptor (GBI), and the mitigation of Missile Field 4 (MF-4) Obsolescence.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD08 / <i>Ground Based Midcourse</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD08: <i>Ground Based Midcourse</i>	3,384.755	981.437	906.692	872.895	-	872.895	990.175	793.532	539.759	518.995	Continuing	Continuing
Quantity of RDT&E Articles	11	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2018 to FY 2019 reflects completion and delivery of Ground Based Interceptors (GBIs) 48-57 and completion of the preponderance of 2- or 3-Stage Selectable Booster Software development.

A. Mission Description and Budget Item Justification

Ground-based Midcourse Defense (GMD) includes development and delivery of GMD Ground Systems, Ground Based Interceptors, Systems Engineering and Program Management. Development objectives for GMD include: improve homeland defensive capability against an evolving threat that is increasing both in number of missiles and complexity of threat payloads, execute Salvo Flight Test GMD (FTG-11), modernize the GMD ground system, provide fire control and communications, develop GBI software enhancements that improve reliability and discrimination, improve GMD models and simulations, and participate with other BMDS assets in system ground tests. GMD will continue the effort to develop and field improved standalone and integrated BMDS discrimination capabilities, both of which will improve the BMD System's ability to identify lethal reentry vehicles and non-lethal threat objects for enhanced interceptor performance.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Ground Based Interceptor Development	130.007	134.389	50.573
Articles:	-	-	-
Description: The Ground Based Interceptor (GBI) Program will continue to develop improvements to enhance reliability, counter emerging threats, eliminate obsolescence and incorporate available technologies. The increase in FY 2018 begins work to perform an obsolescence redesign of the boost vehicle and support fielding 64 GBIs. Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans:			
-Test and field interceptor software upgrade with improved mid-term discrimination capability and capabilities to improve EKV performance reliability for known issues in order to enhance system capability against robust threat systems			
-Deliver two flight test configured interceptors to support the first GBI salvo test (FTG-11)			
-Continue booster development to increase the capacity of GBIs for the warfighter to defeat developing threats in terms of number of threat missiles and complexity of threat payloads.			
-Continue work to increase GBI inventory from 44 to 64.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD08 / <i>Ground Based Midcourse</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>-Risk reduction for additional 20 GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review</p> <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> -Deliver two flight test configured interceptors to support the first GBI salvo test (FTG-11) -Continue to develop, test and field interceptor software upgrade with improved mid-term discrimination capability and capabilities to improve EKV performance reliability for known issues in order to enhance system capability against robust threat systems -Initiate the conversion of a Configuration 1 boost to a Configuration 2 flight test boost vehicle to support the first Redesigned Kill Vehicle (RKV) test (CTV-03) <p>Continue booster development to address inertial measurement unit obsolescence and increase the capacity of GBIs available for the warfighter from 44 to 64 to defeat developing threats</p> <ul style="list-style-type: none"> -Complete development of 2- or 3-Stage selectable boost vehicle software that provides additional engagement battlespace to the warfighter -FTG 11 now scheduled in FY19 <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p> <p>Decrease from FY 2018 to FY 2019 due to completion of the majority of the development work to include completion of the preponderance of 2- or 3-Stage Selectable Booster Software.</p>				
<p>Title: Ground Based Interceptor Manufacturing</p> <p align="right">Articles:</p> <p>Description: The Ground Based Interceptor (GBI) Program will continue acquisition of additional boosters to support flight testing and to ensure the number of fielded GBIs does not decrease through the FYDP. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Deliver the final three of nine tactical CE-II Block I EKV/ C2 integrated boost vehicles with the CBAU GBI to improve warfighter capability and capacity. - Begins work to ensure no fewer than 44 GBIs are deployed through the FYDP <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Complete acquisition of CE-II Block I EKV/ C2 integrated boost vehicles with the CBAU GBI to improve warfighter capability and capacity. 		283.654	125.272	169.542
		-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD08 / <i>Ground Based Midcourse</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
- Continue acquisition of additional boosters to support flight testing and to ensure the number of fielded GBIs does not decrease through the FYDP.				
FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects the acquisition of additional boosters.				
Title: Ground Based Interceptor Reliability		33.217	22.474	15.682
Articles:		-	-	-
Description: The Ground Based Interceptor (GBI) reliability program conducts the analysis and testing necessary to characterize the reliability and service life of the GBI Fleet. The data generated from the reliability program allows the Program Office to manage the GBI fleet, develop design improvements, develop fleet maintenance strategies, and extend interceptor service life. The data is also used by MDA engineering to develop battle simulations for the ground test program; and by the Warfighter in developing tactics, techniques, and procedures.				
Recurring work: Conduct of key KV engineering assessments including integrated sneak circuit analyses, Worst Case Circuit Analysis, and electrical/thermal derating analyses to document current performance/capability and identify potential risk areas to assess and improve overall KV reliability for the Warfighter; collection of RAM-T data and analysis of performance metrics on the Operational System in order to continuously improve the system for the Warfighter; continue the Probabilistic Risk Assessment (reliability model) development to assess the GBI design enabling improvements to overall GBI reliability for Warfighter defense of the homeland; continue SRP functional testing of naturally aged GBI subsystems and components removed from previously fielded GBIs during upgrade/modification to understand performance and aging characteristics in order to establish life limits, achieve GBI maintenance cost savings, and build Warfighter confidence in aging GBIs; and continue rocket motor propellant studies to extend the service life of limited life items in order to achieve cost savings on GBI lifecycle maintenance and further build Warfighter confidence in aging GBIs.				
Specific and/or unique accomplishments to each FY are as follows:				
FY 2018 Plans: SEE ABOVE.				
FY 2019 Plans: - SEE ABOVE.				
FY 2018 to FY 2019 Increase/Decrease Statement:				

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
Decrease from FY 2018 to FY 2019 reflects reduced requirements for GBI reliability testing.				
Title: Systems Engineering and Program Management		285.532	271.609	272.587
		Articles:	-	-
<p>Description: GMD Systems Engineering and Program Management provide essential services for the development and fielding of the GMD hardware and software and Industry Program Management operations.</p> <p>Systems Engineering includes concept definition, requirements and interfaces, system design, integration, test planning and verification efforts. Key products are development and maintenance of the technical baseline and critical engineering processes for implementation and delivery of an integrated GMD element capability.</p> <p>Recurring System Engineering work includes: Continue requirements development, engineering analysis, capability integration, and performance verification for GMD development and BMDS integration; continue to assess current capabilities against the evolving threat; continue sustainment of core information technology data and unified communications services to accomplish research and development activities; continue Technical Direction Agent activities to provide the technical and program execution expertise required to offer independent assessment/analysis, unbiased and objective system level-oriented advice; continue modeling and simulation development and integration to assess component and system performance in support of annual technical assessments; continue modeling and simulation verification, validation, and accreditation (VV&A) to establish high confidence in Warfighter assessments; continue design, planning, and pre- and post-flight test analysis for current and future flight and ground tests to assess system performance and implement a rigorous test plan for verifying successful operation of capabilities delivered to the Warfighter; continue to use the Exoatmospheric Kill Vehicle Hardware-in-the-Loop 10V Chamber for operational analysis of emerging threats, discrimination improvements performance, pre-mission testing and post flight analysis and reconstruction in accordance with the Integrated Master Test Plan to reduce execution risks and gain confidence that capabilities performed as expected; continue requirements audit to include: functional decomposition / traceability, bottoms-up verification, sufficiency audit, and establishment of detailed performance requirement error budgets and allocations to ensure complete understanding of system capability and potential gaps; and continue rigorous independent verification and validation and system engineering analysis of GMD software to increase system performance and reliability.</p> <p>Program Management provides for prime contractor management of the GMD program. This effort includes program and business management, program administration, subcontract management, technical and testing oversight, verification of hardware and software development, quality/safety/mission assurance, integrated logistics support, and infrastructure to develop, test and sustain the GMD system and components while ensuring the program meets all cost, schedule, and performance requirements.</p>				

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
Specific and/or unique accomplishments to each FY are as follows:				
<p>FY 2018 Plans:</p> <ul style="list-style-type: none"> -Complete the Enhanced Homeland Defense Systems Engineering activities under the current prime contract while simultaneously commencing a new Robust Homeland Defense Systems Engineering Prime Contract -Continue the development of modeling and simulation wrapped tactical code to reduce the life cycle cost and increase the fidelity of the results and integrate GMD Sim into the new Objective Simulation Framework (OSF) -Complete design and development of Mid-term discrimination improvements techniques -Continue test planning for discrimination improvements capabilities -Continue development of discrimination improvements through Far Term -Continue to develop the definition of fire control/weapon handover improvements and create preliminary design <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> -Initiate integration phase of ground testing and test analysis for mid-term discrimination capabilities via Ground Test -Complete the Enhanced Homeland Defense Systems Engineering activities executing Increment 6 Systems Engineering under the current Prime Contract -Continue the development of modeling and simulation wrapped tactical code to reduce the life cycle cost and increase the fidelity of the results and integrate GMD Sim into the new Objective Simulation Framework (OSF) -Complete design and development of Mid-term discrimination improvements techniques -Continue test planning for discrimination improvements capabilities -Continue development of discrimination improvements through Far Term -Continue to develop the definition of fire control/weapon handover improvements and create preliminary design that includes: <ul style="list-style-type: none"> - 2/3 Stage Selectable GBI Weapon - Fire Control Cyber security improvements - Initial Integration of RKV <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
Title: Program Operations		80.562	74.216	78.989
		Articles: -	-	-
Description: Program Operations provides for government management of the GMD program. This effort provides: Technical, business, acquisition, configuration management and integration activities to ensure the GMD program meets cost, schedule, and performance goals and ensure program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process; internal Agency program reviews to measure program progress against				

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>the six MDA approved baselines; Mission Assurance and Manufacturing Engineering Program to include Quality, Configuration Management, Manufacturing, Engineering, and Safety (QSMA) in all phases of the system life cycle, throughout the supply chain, and at all levels of assembly emphasizing high yield rates which minimize test and rework costs; and sustainment of core infrastructure and unified communications services to accomplish the GMD mission.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 due to additional personnel required to manage and execute the increased work associated with construction of Missile Field 4, booster obsolescence development, and procurement and fielding of an additional 20 GBIs.</p>			
<p>Title: Ground Systems & Fire Control</p> <p align="right">Articles:</p> <p>Description: The GMD Ground Systems enable control and operation of the GMD Element as part of the Ballistic Missile Defense System (BMDS). Ground Systems consists of the GMD Fire Control system, GMD Communications Network, In-Flight Interceptor Communications System (IFICS) Data Terminal (IDT), Launch Site Components (LSC) (silos, silo interface vaults [SIVs]), and the Launch Support Systems (LSS) (Command and Launch Equipment (CLE), which includes Launch Support Equipment (LSE)).</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> -Complete development of 6B3 software upgrades as determined during fielding and integration into current hardware systems -Continue production and deployment of CLE/GFC re-architecture hardware suites to mitigate obsolescence and increase reliability, sustainability, and availability of GMD fire control systems -Continue development and production of the IDT technology upgrades to support On-Demand Communications capability for systems discrimination data, directed engagement and hit assessments -Complete design and development of 7B upgrades for Mid-Term discrimination improvements; upgrade interfaces to IDT to support On-Demand Communications and Warfighter enhancements -Continue GMD Communications Network (GCN) Modernization efforts to support GMD system expansion and emerging requirement, enhance/maintain Cybersecurity posture, and mitigate hardware and software obsolescence 	168.465 -	278.732 -	285.522 -

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD08 / <i>Ground Based Midcourse</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>-Continue design and development of the version 8 software build that allows implementation of BMDS system track within GMD Ground Systems as well as Mid-Term Discrimination upgrades</p> <p>-Continue planning and implementation of space optimization renovations in the Readiness and Control (R&C) building at Ft Greely, AK for best use by the Warfighter</p> <p>- Initiate system upgrades to the Readiness and Control (R&C) building in Fort Greely, Alaska. The upgrades will maximize shielded protection to vital systems and provide more operational space for the Warfighters</p> <p>-Continue ground systems development to increase the capacity of GBIs for the warfighter to defeat developing threats in terms of number of threat missiles and complexity of threat payloads.</p> <p>-Continue work for 20 new silos and associated support equipment for a new missile field (Missile Field #4) to accommodate the GBIs at Fort Greely, AK.</p> <p>-Risk reduction for acceleration of software builds</p> <p>-Continue design and development of software upgrades for Shoot-Assess-Shoot supported by GMD Post-Intercept Assessment utilizing GMD sensors</p> <p>-Initiate system upgrades to the Readiness and Control (R&C) building in Fort Greely, Alaska. The upgrades will provide maximize shielded protection to vital systems and provide more operational space for the Warfighters</p> <p>FY 2019 Plans:</p> <p>-Complete production and deployment of CLE/GFC re-architecture hardware suites to mitigate obsolescence and increase reliability, sustainability, and availability of GMD fire control systems</p> <p>-Continue development and production of the IDT technology upgrades to support the Redesigned Kill Vehicle On-Demand Communications capability for systems discrimination data, directed engagement and hit assessments</p> <p>-Continue In-Flight Interceptor Communications System (IFICS) End-to-End Test to demonstrate communication between the RKV and the GMD Ground System</p> <p>-Complete design and development of 7B upgrades for Mid-Term discrimination improvements; upgrade interfaces to IDT to support On-Demand Communications and Warfighter enhancements</p> <p>-Continue GS 7B GMD Communications Network (GCN) Modernization efforts to support GMD system expansion and emerging requirement, enhance/maintain Cybersecurity posture, and mitigate hardware and software obsolescence</p> <p>-Continue design and development of the version 8 software build that allows implementation of BMDS system track within GMD Ground Systems as well as Mid-Term Discrimination upgrades</p> <p>-Continue system upgrades to the Readiness and Control (R&C) building in Fort Greely, Alaska. The upgrades will maximize shielded protection to vital systems and provide more operational space for the Warfighters</p> <p>-Continue design and development of software upgrades for Shoot-Assess-Shoot version 9 software supported by GMD Post-Intercept Assessment utilizing GMD sensors</p>			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
-Continue ground systems development to increase the capacity of GBIs for the warfighter to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. -Continue work for 20 new silos and associated support equipment for a new missile field (Missile Field #4) to accommodate the GBIs at Fort Greely, AK. -Continue obsolescence upgrades for GSS in-silo hardware and software to support 20 new silos and enhance cybersecurity. -Continue work to add two additional silos in Missile Field 1 at Fort Greely, AK FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects additional funding required to add two additional silos in Missile Field 1 at Fort Greely, AK to ensure the number of fielded GBIs does not decrease through the FYDP.			
Accomplishments/Planned Programs Subtotals	981.437	906.692	872.895

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0203882C: MD08: GMD O&M	129.281	137.896	143.027	-	143.027	139.319	142.269	145.188	0.000	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing
• 0604874C: <i>Improved Homeland Defense (HLD) Interceptors</i>	247.362	636.430	561.220	-	561.220	485.755	502.023	604.309	635.719	Continuing	Continuing
• 0604887C: <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	61.350	76.757	81.934	-	81.934	95.458	82.956	78.715	85.362	Continuing	Continuing
• 0604894C: <i>Multi Object Kill Vehicle</i>	0.000	6.500	8.256	-	8.256	33.935	8.277	184.118	355.060	0.000	596.146

Remarks

D. Acquisition Strategy

The GMD program will continue to follow testing, development, and evolutionary acquisition through incremental development. The Agency acquisition strategy ensures GMD components are upgraded to improve both All-Up System (AUS) performance and All-Up Round (AUR) performance in order to retain the proven GMD contribution to the Integrated BMDS. This acquisition approach reduces obsolescence risk, provides opportunities for incremental capability improvements, and allows decision makers to make informed trades between cost, schedule, and performance while exploring improved operational and technological capabilities.

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<p>GMD awarded a competitive Development and Sustainment Contract (DSC) on December 30, 2011. This contract continues development, fielding, test, systems engineering, integration, and configuration management; equipment manufacturing and upgrade; training, operations and sustainment of the GMD system and associated support facilities. The DSC emphasizes the application of performance-based tenets to provide timely high quality support of the core GMD system while reducing life cycle and long-term ownership costs. GMD's acquisition strategy for transition of the legacy content into the DSC provides uninterrupted field operations; development of both Ground Systems and GBI products, including manufacturing additional interceptors to support both operations and testing and the requirement to demonstrate war fighting capability through a rigorous ground and flight test program.</p> <p>In January of 2018 the MDA Director signed an Acquisition Strategy Decision Memorandum (ASDM) changing the acquisition strategy to execute the Missile Defeat and Defense Enhancement scope. The Development and Sustainment Contract (DSC) will continue with the Boeing Company to Q1 FY2024 to build the 20 GBI's and 20 Silo's with supporting test, engineering, software, and performance based logistics scope. This additional capability will provide 64 interceptors by the end of calendar year 2023 as well as maintain operation and support capabilities and support upcoming ground and flight tests. The Justification and Approval for this action was signed by the MDA Director on 2 January 2018.</p> <p><u>E. Performance Metrics</u> N/A</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Ground Based Interceptor Development - Booster Development	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	0.000	72.000	Oct 2016	53.000		27.000		-		27.000	Continuing	Continuing	Continuing
Ground Based Interceptor Development - Configuration 2 CBAU Booster Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	50.354	3.192	Nov 2016	1.005	Nov 2017	0.000		-		0.000	0.000	54.551	0.000
Ground Based Interceptor Development - Configuration 3 Booster Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.954	0.216		0.000		0.000		-		0.000	0.000	1.170	0.000
Ground Based Interceptor Development - EKV New & Modified Component Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	22.331	1.562	Nov 2016	0.000		0.000		-		0.000	0.000	23.893	0.000
Ground Based Interceptor Development - Flight Rotations for Ballistic Missile Defense System Level Testing	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	32.309	29.259	Nov 2016	6.383	Nov 2017	10.584	Nov 2018	-		10.584	Continuing	Continuing	Continuing
Ground Based Interceptor Development - Obsolescence work to ensure no fewer than 44 GBIs are deployed through the FYDP	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.000	0.000		36.999	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Ground Based Interceptor Development - Operational Spares	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	17.423	5.007	Nov 2016	0.000		0.000		-		0.000	0.000	22.430	0.000
Ground Based Interceptor Development - Prior year no longer funded in the FYDP	Various	Various : Various	35.541	0.000		0.000		0.000		-		0.000	0.000	35.541	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Ground Based Interceptor Development - Software Maintenance & Updates	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	28.461	18.771	Nov 2016	37.002	Nov 2017	12.989	Nov 2018	-		12.989	Continuing	Continuing	Continuing
Ground Based Interceptor Manufacturing - Additional Boosters	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.000	40.084	Nov 2016	13.000		133.817	Nov 2018	-		133.817	Continuing	Continuing	Continuing
Ground Based Interceptor Manufacturing - Booster work to ensure no fewer than 44 GBIs are deployed through the FYDP	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.000	0.000		30.467	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Ground Based Interceptor Manufacturing - GBI Prime Product Support	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	191.489	44.449	Nov 2016	39.190	Nov 2017	27.934	Nov 2018	-		27.934	Continuing	Continuing	Continuing
Ground Based Interceptor Manufacturing - Ground Based Interceptors #34-44 (CE-II)	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	0.000	4.800	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ground Based Interceptor Manufacturing - Interceptor Manufacturing Support	MIPR	NASA MSFC& AMRDEC, HSV, AL : Draper Laboratory, MA; Vanguard, HSV, AL	11.876	4.248	Nov 2016	2.680	Nov 2017	0.629	Nov 2018	-		0.629	Continuing	Continuing	Continuing
Ground Based Interceptor Manufacturing - Prime Ground Based Interceptors 48-58 (CE-II Block 1)	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	515.131	190.073	Nov 2016	39.935	Nov 2017	7.162	Nov 2018	-		7.162	Continuing	Continuing	Continuing
Ground Based Interceptor Manufacturing - Prior year no longer funded in the FYDP	Various	Various : Various	115.768	0.000		0.000		0.000		-		0.000	0.000	115.768	0.000
Ground Based Interceptor Reliability - Government Reliability Program	MIPR	AMRDEC / Redstone Arsenal, AL : NSWC Crane, IN	13.389	4.580	Nov 2016	5.946	Nov 2017	4.722	Nov 2018	-		4.722	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Ground Based Interceptor Reliability - Prime Currently Fielded CE-II Upgrades	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	72.456	17.454	Nov 2016	0.000		0.000		-		0.000	0.000	89.910	0.000
Ground Based Interceptor Reliability - Prime GBI Functional Testing	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	17.025	5.053	Nov 2016	9.599	Nov 2017	1.888	Nov 2018	-		1.888	Continuing	Continuing	Continuing
Ground Based Interceptor Reliability - Prime Reliability & Systems Engineering	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	7.942	0.000		0.000		0.000		-		0.000	0.000	7.942	0.000
Ground Based Interceptor Reliability - Prime Reliability Program	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	25.418	6.130	Nov 2016	6.929	Nov 2017	9.072	Nov 2018	-		9.072	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Government Fort Drum IDT	MIPR	MDA/AL : /VA/NY	0.576	0.000		0.000		0.000		-		0.000	0.000	0.576	0.000
Ground Systems & Fire Control - Government Missile Field 4 (20 Silos)	MIPR	MDA : AL/VA	0.000	1.200		13.000		10.000		-		10.000	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Government Software Development	MIPR	AMRDEC : Redstone Arsenal, AL	1.131	8.849	Nov 2016	8.181	Nov 2017	6.683	Nov 2018	-		6.683	Continuing	Continuing	Continuing
Ground Systems & Fire Control - MF-1: two silos to ensure the number of fielded GBIs does not decrease through the FYDP	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/VA	0.000	0.000		56.534	Nov 2017	37.000		-		37.000	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime CLE Re-Architecture	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	46.609	0.000		4.031	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	4.244	1.664	Nov 2016	1.116	Nov 2017	0.218	Nov 2018	-		0.218	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD08 / <i>Ground Based Midcourse</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Communications Infrastructure															
Ground Systems & Fire Control - Prime Fort Drum IDT	C/CPIF	Boeing AL : CO/NY/VA	10.043	0.020		0.000		0.000		-		0.000	0.000	10.063	0.000
Ground Systems & Fire Control - Prime Ground Systems Software Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	299.387	11.147	Nov 2016	86.521	Nov 2017	100.631	Nov 2018	-		100.631	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime MF-1 Repair and Refurbishment	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	35.639	3.286		0.000		0.000		-		0.000	0.000	38.925	0.000
Ground Systems & Fire Control - Prime Missile Field 4 (20 Silos)	C/CPIF	Boeing : AL/AK/AZ/CA/CO/VA	0.000	8.048	Nov 2016	38.000		68.000		-		68.000	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime On Demand Communications	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	0.000	0.000		16.521	Nov 2017	19.081	Nov 2018	-		19.081	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime Post-Intercept Assessment	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	0.000	0.000		4.840	Nov 2017	4.359	Nov 2018	-		4.359	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime Technology Refresh	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	54.780	134.251	Nov 2016	49.988	Nov 2017	39.550	Nov 2018	-		39.550	Continuing	Continuing	Continuing
Subtotal			1,610.276	615.343		560.867		521.319		-		521.319	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
0400 / 4				PE 0603882C / Ballistic Missile Defense Midcourse Defense Segment						MD08 / Ground Based Midcourse					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering and Program Management - Cyber Security	MIPR	MDA : AL/VA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
Systems Engineering and Program Management - Government Discrimination Improvements	MIPR	FFRDC/UARC : AL	5.399	3.152	Nov 2016	7.069	Nov 2017	3.646	Nov 2018	-		3.646	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Government EKV HWIL Tests in Space Chamber	MIPR	AEDC : Tullahoma, TN	21.309	6.092	Nov 2016	7.230	Nov 2017	7.374	Nov 2018	-		7.374	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Government Modeling and Simulation	MIPR	SED and Morrow Labs : Redstone Arsenal/AL	68.187	18.460	Nov 2016	18.610	Nov 2017	20.975	Nov 2018	-		20.975	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Government Systems Engineering & Integration	MIPR	AMRDEC : HSV/AL	27.240	34.202	Nov 2016	47.929	Nov 2017	59.381	Nov 2018	-		59.381	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Information Management & Technology Ops	C/CPAF	Northrop Grumman/ Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	16.520	9.150	Nov 2016	13.210	Nov 2017	12.912	Nov 2018	-		12.912	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Model & Simulations Industry Support	C/CPAF	Northrop Grumman : AI, VA	2.539	0.000		0.000		0.000		-		0.000	0.000	2.539	0.000
Systems Engineering and Program Management - Prime Design, Readiness, Analysis and Reporting	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.000	14.521	Nov 2016	20.650	Nov 2017	9.668	Nov 2018	-		9.668	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime Discrimination Improvements	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	36.849	20.501	Nov 2016	8.142	Nov 2017	3.557	Nov 2018	-		3.557	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
0400 / 4				PE 0603882C / Ballistic Missile Defense Midcourse Defense Segment					MD08 / Ground Based Midcourse						
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering and Program Management - Prime EKV HWIL Tests in Space Chamber	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	66.915	2.063	Nov 2016	1.678	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime Modeling and Simulation	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	170.840	14.243	Nov 2016	14.502	Nov 2017	13.118	Nov 2018	-		13.118	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime Program Management	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	180.475	76.890	Nov 2016	53.293	Nov 2017	38.357	Nov 2018	-		38.357	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime System Engineering and Integration	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	330.516	36.800	Nov 2016	27.741	Nov 2017	48.247	Nov 2018	-		48.247	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering & Analysis	MIPR	Various : AL/VA	22.953	2.914	Nov 2016	5.149	Nov 2017	1.921	Nov 2018	-		1.921	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering & Analysis - CSS Support	C/CPFF	MiDAESS/TEAMS : AL	8.770	2.945	Nov 2016	2.846	Nov 2017	6.607	Nov 2018	-		6.607	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering & Analysis - FFRDC / UARC	MIPR	Various : AL/VA	2.036	4.364	Nov 2016	2.543	Nov 2017	3.454	Nov 2018	-		3.454	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering & Analysis - Industry Support	C/CPAF	Boeing : AL	14.793	2.476	Nov 2016	5.810	Nov 2017	6.011	Nov 2018	-		6.011	Continuing	Continuing	Continuing
Systems Engineering and Program Management	MIPR	Various : AL, VA	6.897	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD08 / <i>Ground Based Midcourse</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
- Systems Engineering & Analysis - Threat Analysis / FFRDC / UARC															
Systems Engineering and Program Management - Systems Engineering and Program Management - Discrimination Engineering & Analysis	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.000	9.043	Nov 2016	9.980	Nov 2017	12.737	Nov 2018	-		12.737	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering and Program Management Model & Simulations Support	Allot	MDA : AL/VA	31.449	8.647	Oct 2016	9.507	Oct 2017	8.430	Oct 2018	-		8.430	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Technical Direction Agent	MIPR	AL/CA/GA/MA : MD/NM/UT/VA	20.437	19.069	Oct 2016	15.720	Nov 2017	16.192	Nov 2018	-		16.192	Continuing	Continuing	Continuing
Program Operations - Contract Support Services	C/CPFF	Various : AL/AK/CA/CO/VA	405.911	38.537	Oct 2016	28.895	Oct 2017	30.352	Oct 2018	-		30.352	Continuing	Continuing	Continuing
Program Operations - FFRDC Support	MIPR	MIT/LL : AL/VA/CO	44.694	4.462	Oct 2016	4.674	Oct 2017	4.538	Oct 2018	-		4.538	Continuing	Continuing	Continuing
Program Operations - Government Civilian Salaries	MIPR	MDA : AL/VA	236.264	29.750	Oct 2016	31.822	Oct 2017	33.939	Oct 2018	-		33.939	Continuing	Continuing	Continuing
Program Operations - Information Technology Services	MIPR	MDA : AL/CA/VA/CO/AK	3.447	0.137	Nov 2016	1.256	Nov 2017	0.572	Nov 2018	-		0.572	Continuing	Continuing	Continuing
Program Operations - Other Govt Agencies	MIPR	Various : AL/VA/FL/CO	41.782	6.083	Oct 2016	5.869	Oct 2017	7.975	Oct 2018	-		7.975	Continuing	Continuing	Continuing
Program Operations - Safety and Quality	MIPR	MDA : AL/AK/CA/VA	0.567	0.016	Nov 2016	0.016	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - Travel	MIPR	MDA : AL/VA	7.690	1.577	Oct 2016	1.684	Oct 2017	1.613	Oct 2018	-		1.613	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD08 / <i>Ground Based Midcourse</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			1,774.479	366.094		345.825		351.576		-		351.576	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3,384.755	981.437	906.692	872.895	-	872.895	Continuing	Continuing	N/A

Remarks

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD08 / <i>Ground Based Midcourse</i>
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	Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆											
	Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇											
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
CLE Re-architecture	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆																
Communications Infrastructure	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆								
Ground Based Interceptors Rotation and Upgrades	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Technology Refresh	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆				
Deliver GBIs (48-50)	◆																											
On Demand Communications	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆												
Deliver GBIs (51-53)		◆	◆	◆																								
Ground Systems 7A Mid Term (FQT)			◆																									
Deliver GBIs (54-58)				◆	◆	◆																						
Post-Intercept Assessment Start					◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆				
Ground Systems 7B Mid Term DIHD (FQT)								◆																				
Hawaii IFICS Data Terminal (IDT)																		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Ground Systems Software 8 Development (FQT)																		◆										
Ground Systems Software 9 Development (FQT)																								◆				

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD08 / <i>Ground Based Midcourse</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CLE Re-architecture	1	2017	4	2019
Communications Infrastructure	1	2017	4	2021
Ground Based Interceptors Rotation and Upgrades	1	2017	4	2023
Technology Refresh	1	2017	4	2022
Deliver GBIs (48-50)	1	2017	1	2017
On Demand Communications	1	2017	4	2020
Deliver GBIs (51-53)	2	2017	4	2017
Ground Systems 7A Mid Term (FQT)	3	2017	3	2017
Deliver GBIs (54-58)	4	2017	2	2018
Post-Intercept Assessment Start	1	2018	4	2022
Ground Systems 7B Mid Term DIHD (FQT)	4	2018	4	2018
Hawaii IFICS Data Terminal (IDT)	2	2021	4	2023
Ground Systems Software 8 Development (FQT)	4	2021	4	2021
Ground Systems Software 9 Development (FQT)	4	2022	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MC08 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC08: <i>Cyber Operations</i>	21.534	12.329	18.818	23.754	-	23.754	26.372	26.575	19.463	25.454	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
Increase from FY 2018 to FY 2019 is due to increased efforts to mitigate cybersecurity threats.

A. Mission Description and Budget Item Justification

The funding in this project sustains MDA Risk Management Framework and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Systems Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA GMD mission systems. It maintains the Assessment and Authorization (A&A) data repository, capturing the RMF documentation (artifacts, validation results, and Cybersecurity Risk Assessment results, and Authorization decisions) and POA&Ms on all MDA information systems.

This project supports the monitoring and tracking of Cybersecurity mitigations detailed in Information Technology security POA&Ms. Activities include preparation of A&A documentation and authorization recommendations to the MDA Senior Information Systems Security Officer (SISSO)/ Security Control Assessor (SCA), and Authorizing Official (AO). Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Systems Modernization Act (FISMA) 2014.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Network / System Certification and Accreditation (C&A)	4.329	4.763	5.115
Articles:	-	-	-
Description: Sustains the MDA Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA Ground-based Midcourse Defense (GMD) mission system. It maintains the Assessment and Authorization (A&A) data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Authorization Official (AO) accreditation decisions) and POA&M on all MDA information systems. Provides GMD Information Security Systems Manager (ISSM) civilian salaries. Conducts cybersecurity/ Information Assurance (IA) engineering and architecture planning for GMD information technology systems. Plans and tests cybersecurity controls for BMDS GMD systems. Conducts Controls Validation Testing (CVT) of GMD mission systems and provide Plan of Action and Milestones to mitigate cybersecurity deficiencies. Conducts annual cybersecurity reviews on the GMD enclaves to assess compliance in implementing and maintaining cybersecurity controls. Develops GMD DoD Risk Management Framework (RMF) Assessment and Authorization packages.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MC08 / <i>Cyber Operations</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:
- SEE ABOVE.

FY 2019 Plans:
- SEE ABOVE.

FY 2018 to FY 2019 Increase/Decrease Statement:
-Increase from FY 2018 to FY 2019 reflects an increase in priority of efforts to mitigate cyber security threats.

Title: Cybersecurity	8.000	14.055	18.639
Articles:	-	-	-

Description: Implements the GMD Cybersecurity Program and Defense in Depth Cybersecurity Strategy for the GMD Weapon System's Research, Development, Test, and Operational Mission Environment Systems, Networks, and Enclaves to ensure confidentiality, integrity, and availability of the System to the Warfighter.

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:
-Increase from FY 2018 to FY 2019 is due to increased efforts to mitigate cyber security threats.

-Continue assessing, implementing, documenting, and validating up to 512 cybersecurity control families (1935 security protections and control enhancements) for 25 representative systems which are comprised of 250,000 computing and logic bearing components supporting the GMD Development, Test, Training, and Operational missions. This will result in improved Confidentiality, Integrity, and Availability of the GMD System while ensuring mandatory compliance with Risk Management Framework

-Continue implementing necessary upgrades to enhance the cybersecurity posture of the GMD operational environments and it's supporting information systems and networks while remaining responsive to active or emerging cyber threats against GMD

-Continue ensuring compliance with security mandates to maintain continued authorization to operate while eliminating or reducing risks assessed against the program by implementing vulnerability mitigation activities

-Continue protecting the GMD systems through the incorporation of a Defense-in-depth cybersecurity strategy which requires a fully qualified cybersecurity workforce to include training and certification of nearly 450 Cybersecurity Workforce personnel involved in developing, operating, and maintaining GMD test, training, and mission support information systems and networks and

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MC08 / <i>Cyber Operations</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
enclaves at various GMD locations such as: Vandenberg Air Force Base, CA; Fort Greely, AK; Fort Drum, NY; and the Missile Defense Integration Operations Center in Colorado Springs, CO			
<i>FY 2019 Plans:</i> -Continue assessing, implementing, documenting, and validating up to 512 cybersecurity control families (1935 security protections and control enhancements) for 25 representative systems which are comprised of 250,000 computing and logic bearing components supporting the GMD Development, Test, Training, and Operational missions. This will result in improved confidentiality, integrity, and availability of the GMD System while ensuring mandatory compliance with Risk Management Framework -Continue implementing necessary upgrades to enhance the cybersecurity posture of the GMD operational environments and its supporting information systems and networks while remaining responsive to active or emerging cyber threats against GMD -Continue ensuring compliance with security mandates to maintain continued authorization to operate while eliminating or reducing risks assessed against the program by implementing vulnerability mitigation activities -Continue protecting the GMD systems through the incorporation of a Defense-in-depth cybersecurity strategy which requires a fully qualified cybersecurity workforce to include training and certification of nearly 450 Cybersecurity Workforce personnel involved in developing, operating, and maintaining GMD test, training, and mission support information systems and networks and enclaves at various GMD locations such as: Vandenberg Air Force Base, CA; Fort Greely, AK; Fort Drum, NY; and the Missile Defense Integration Operations Center in Colorado Springs, CO			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> Increase from FY 2018 to FY 2019 reflects increased efforts to mitigate cybersecurity threats.			
Accomplishments/Planned Programs Subtotals	12.329	18.818	23.754

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0203882C: MD08: GMD O&M	129.281	137.896	143.027	-	143.027	139.319	142.269	145.188	0.000	Continuing	Continuing
• 0604874C: Improved Homeland Defense (HLD) Interceptors	247.362	636.430	561.220	-	561.220	485.755	502.023	604.309	635.719	Continuing	Continuing
• 0604887C: Ballistic Missile Defense Midcourse Defense Segment Test	61.350	76.757	81.934	-	81.934	95.458	82.956	78.715	85.362	Continuing	Continuing

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MC08 / <i>Cyber Operations</i>

D. Acquisition Strategy

GMD uses the cybersecurity funding to apply security engineering principles to acquire, design, test, implement and field technical solutions throughout the systems architecture to ensure sufficient protections exist from a threat and risk based approach. To achieve this, cybersecurity protection requirements must be validated and properly flowed into system requirements and design specifications early enough to provide the most cost benefit. Many BMDS systems are now or within the very near future undergoing tech-refresh and so the opportunity to receive the most benefit of implementing the more stringent protections is at hand and aligns with the proposed budget as submitted.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MC08 / <i>Cyber Operations</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network / System Certification and Accreditation (C&A) - Civilian Salaries	MIPR	MDA : AL/VA	2.328	0.460	Oct 2016	1.026	Oct 2017	1.071	Oct 2018	-		1.071	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Contract Support Services	C/CPFF	Booz Allen Hamilton, AI : Torch Technologies, AI	10.209	3.869	Nov 2016	3.737	Nov 2017	4.044	Oct 2018	-		4.044	Continuing	Continuing	Continuing
Cybersecurity - Cybersecurity	MIPR	SMDC : Redstone Arsenal, AL	5.653	4.950		8.000	Nov 2017	11.260	Nov 2018	-		11.260	Continuing	Continuing	Continuing
Cybersecurity - GMD Cybersecurity Program	C/CPIF	Boeing : AL	0.469	0.482		0.924	Nov 2017	1.984	Nov 2018	-		1.984	Continuing	Continuing	Continuing
Cybersecurity - Ground Systems Software Cybersecurity	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	2.875	2.568		5.131	Nov 2017	5.395	Nov 2018	-		5.395	Continuing	Continuing	Continuing
Subtotal			21.534	12.329		18.818		23.754		-		23.754	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	21.534	12.329	18.818	23.754	-	23.754	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MC08 / <i>Cyber Operations</i>
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	Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆									
	Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇									
	FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023	
GMD Cybersecurity Mitigation Monitoring and Tracking	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
GMD Cybersecurity Program Policy / Risk Management	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
GMD Information Assurance Certification and Accreditation (C&A) Package Preparation/Submission	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
GMD Transition to Cybersecurity Risk Management Framework (CRMF)	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
BMDS Cybersecurity Policy Development	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MC08 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
GMD Cybersecurity Mitigation Monitoring and Tracking	1	2017	4	2023
GMD Cybersecurity Program Policy / Risk Management	1	2017	4	2023
GMD Information Assurance Certification and Accreditation (C&A) Package Preparation/ Submission	1	2017	4	2023
GMD Transition to Cybersecurity Risk Management Framework (CRMF)	1	2017	4	2023
BMDS Cybersecurity Policy Development	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	235.412	41.095	31.587	29.710	-	29.710	29.688	27.430	26.734	28.170	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support reflects proportional changes as a result of budget changes in Ballistic Missile Defense Midcourse Defense Segment program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	41.095	31.587	29.710
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	41.095	31.587	29.710

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy N/A		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	14.188	0.749	Jul 2017	0.632	Jul 2018	0.427	Jul 2019	-		0.427	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	MDA : Multi: AK, AL, CA, CO, VA	163.639	30.056	Oct 2016	30.348	Oct 2017	26.223	Oct 2018	-		26.223	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (FFP)	C/FFP	PHACIL, INC : Multi: AK, AL, CA, CO, VA	12.430	10.290	Jul 2017	0.607	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPR)	MIPR	Various : Multi: AK, AL, CO, CA, HI, VA	26.298	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AK, AL, CA, CO, HI, VA	13.625	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Sustainment Transportation	Reqn	Various : AK, AL, CA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPFF	Utah St Univ; JHU/ APL LLC : Multi: MD, UT	1.372	0.000		0.000		0.000		-		0.000	3.500	4.872	0.000
Program Wide Support - Facilities and Maintenance	MIPR	Various : Multi: AK, AL, CA, VA	3.860	0.000		0.000		3.060	May 2019	-		3.060	Continuing	Continuing	Continuing
Subtotal			235.412	41.095		31.587		29.710		-		29.710	Continuing	Continuing	N/A

Remarks
Support is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency								Date: February 2018			
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>				Project (Number/Name) MD40 / <i>Program-Wide Support</i>			
	Prior Years	FY 2017		FY 2018		FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	235.412	41.095		31.587		29.710	-	29.710	Continuing	Continuing	N/A

Remarks

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆							
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇							
					FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
MD40 Program-Wide Support					◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603882C / <i>Ballistic Missile Defense Midcourse Defense Segment</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,165.906	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
MD11: <i>BMDs Radars</i>	1,086.043	242.049	244.332	206.836	-	206.836	226.889	241.306	240.203	237.978	Continuing	Continuing
MD41: <i>Homeland Defense Radar - Hawaii (HDR-H)</i>	-	0.000	21.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.000
MC11: <i>Cyber Operations</i>	3.871	1.230	3.636	1.079	-	1.079	7.788	4.368	1.145	1.168	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	75.992	9.386	9.177	12.961	-	12.961	15.561	21.828	22.410	21.127	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$19.600M was required to address emergency warfighting requirements in support of Advanced Discrimination and extended lifespan of the COBRA DANE radar. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$30.800M is required to address emergency warfighting requirements in support of Advanced Discrimination and extended lifespan of the COBRA DANE radar. Additional details are available at a higher classification level.

Beginning in FY 2019 the Homeland Defense Radar - Hawaii (HDR-H) will be realigned to the Pacific Discriminating Radar Program Element 0604673C, Project MD41, from Ballistic Missile Defense Sensors Program Element 0603884C, Project MD41.

Beginning in FY 2019 the Budget Project (MD41) title will change from Pacific Radar to Homeland Defense Radar - Hawaii (HDR-H)

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System (BMDS) network of layered Sensors provides essential situational awareness and fire control data for the command and control of BMDS weapon systems, such as Ground-based Midcourse Defense (GMD), Aegis Ballistic Missile Defense (BMD), and Terminal High Altitude Area Defense (THAAD). The suite of remote ground-based sensors provides; early warning, midcourse and terminal ballistic missile defense threat data enabling layered detection and tracking of ballistic missile targets, providing fire-control quality position, velocity, and discrimination data through Ground-Based Midcourse Defense Fire Control (GFC), or Command and Control, Battle Management, Communications (C2BMC).

Overlapping coverage of geographically diverse sensors provides improved threat track data, reduces the impact of the loss of any one sensor, and reduces the potential impact of countermeasures. The extended coverage and accuracy provided by a network of layered sensors increases the defensive footprint and reduces the number of target engagements required, thereby conserving interceptor inventory and maintaining a high probability of successful engagement. Networked forward-based sensors enable C2BMC to pair the best sensor coverage with the best available weapon system to provide the most effective defense against ballistic missile threats.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0603884C / Ballistic Missile Defense Sensors
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This program element includes BMDS threat discrimination improvements, which will enhance BMDS effectiveness against the evolving adversary threat. The result will be a BMDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and more efficiently using interceptor inventory. BMDS threat discrimination improvements are funded from the Enabling (0603890C), Midcourse (0603882C), BMD Sensors (0603884C), C2BMC (0603896C), and Aegis BMD (0603892C) PEs.

The BMD Sensors Program contributes to regional missile defense through the development, delivery and deployment/redeployment of Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) radars for operations or tests. AN/TPY-2 radars can be configured to operate either as a THAAD Fire Unit Radar (terminal mode) or Forward-Based Radar. These radars are transportable, they add flexibility to respond to geographical changes in threats. Radars provide early warning tracking and discrimination data through all phases of ballistic missile flight. Through the BMDS C2BMC and coalition data links, the AN/TPY-2 provides fire control data to enable remote Standard Missile (SM)-3 engagements by Aegis BMD, and to cue deployed THAAD and U.S. and partner Patriot batteries.

The BMDS sensor network includes; the COBRA DANE Radar at Eareckson Air Station, Alaska, the Upgraded Early Warning Radars (UEWRs) at Beale Air Force Base, CA; Fylingdales Royal Air Force, United Kingdom, and Thule Air Base in Greenland for defense of the homeland. The Clear Ultra High Frequency Early Warning Radar (EWR), at Clear Air Force Station, AK, and the Cape Cod EWR, at Cape Cod Air Force Station, MA, are also being upgraded to include missile defense functionality against long-range threats in addition to their existing Missile Warning and Space Surveillance missions. Upgrade activities began in CY 2012 and are expected to be completed in CY 2018. The addition of the Clear UEWR and Cape Cod UEWRs to the BMDS sensor architecture will improve BMDS sensor coverage and provide new engagement options against long-range missile threats from Northeast Asia and Southwest Asia respectively.

The Homeland Defense Radar - Hawaii (HDR-H) is a new sensor within the BMDS that addresses NORTHCOM and PACOM radar requirements for the defense of Hawaii. The HDR-H is a long range ballistic missile defense sensor that provides a persistent operational capability for the defense of the Pacific region. It improves the discrimination capability to address multiple threats including the no warning strategic challenges of a road mobile ICBM. The radar will leverage development efforts from other sensor projects to reuse discrimination, low elevation acquisition, and tracking algorithms. The Pacific Radar final testing, integration and delivery is planned for FY 2023.

Cyber Operations sustain the Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments, and reviews of Plans of Action and Milestones (POA&Ms) for the Sensors mission system.

This Program Element also investigates concepts and performs systems engineering to address hypersonic threats.

FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+6.400M was required to address emergency warfighting readiness requirements.

+\$6.400M Project MD11-BMDS Radar to implement AN/TPY-2 Noise Mitigation.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$19.600M was required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level.

+\$19.600M Project MD11 BMDS Radars. This is a base budget requirement.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	PE 0603884C / <i>Ballistic Missile Defense Sensors</i>

+\$3.600M is required to support Advanced Discrimination efforts focused on countering the emergent threats to the homeland, forward deployed forces, and allies.
 +\$16.000M is required to extend the lifespan of the COBRA DANE radar, which provides critical coverages of North Korean threats. Upgrades include critical life extension redesign and software rehosting to ensure continued operations. This is a base budget requirement.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: \$30.800M is required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level.

+\$30.800M Project MD11 BMDS Radars. This is a base budget requirement.

+\$3.000M is required to improve the BMDS ability to identify lethal and non-lethal objects. This Advanced Discrimination is required to continue to defend the homeland, deployed forces and regional allies against evolving threats of increasing sophistication.

+\$5.000M is required to conduct studies and evaluations in support of a Medium Range Discriminating Radar (MRDR) to address gaps in the BMDS and better protect the homeland and regional allies. An MRDR would include BMDS threat discrimination improvements to enhance BMD effectiveness against the evolving threat.

+\$17.800M is required to fund Phase 1, 2 and 3 efforts of the U.S. Forces Korea (USFK) Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier

(THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement - MSE) ballistic missile defense system that expands engagement options and increases coverage area.

+\$5.000M is required to extend the lifespan of the COBRA DANE radar, a long-range sensor that provides critical coverage of potential North Korean threats. Nearly all of the major COBRA DANE systems have aged well beyond their intended design lifespan and the majority of the radar components are largely obsolete. Upgrades include critical life extension redesign and software re-hosting to ensure continued operations of COBRA DANE.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	230.077	247.345	247.643	-	247.643
Current President's Budget	252.665	278.145	220.876	-	220.876
Total Adjustments	22.588	30.800	-26.767	-	-26.767
• Congressional General Reductions	-8.100	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	9.842	0.000			
• SBIR/STTR Transfer	-5.154	0.000			
• FY 2017 Request for Additional Appropriations	6.400	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	19.600	30.800	0.000	-	0.000
• Other Adjustment	0.000	0.000	-26.767	-	-26.767

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>
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Change Summary Explanation

The FY 2017 reprogramming of \$+9.842M reflects an increase for initiation of AN/TPY-2 Gallium Nitride (GaN) Transition to Production (TTP). The decrease from PB18 to PB19 in FY 2019 reflects the realignment of the Homeland Defense Radar - Hawaii (HDR-H) from the Ballistic Missile Defense Sensors Program Element 0603884C to the Pacific Discriminating Radar Program Element 0604673C.

FY 2017: \$+8.100 transfer of program office to PE0603874C LRDR

FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+6.400M was required to address emergency warfighting readiness requirements. \$+6.400M Project MD11-BMDS Radar to implement AN/TPY-2 Noise Mitigation.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$19.600M was required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: \$30.800M is required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD11: <i>BMDS Radars</i>	1,086.043	242.049	244.332	206.836	-	206.836	226.889	241.306	240.203	237.978	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The BMDS Radars project includes development of future AN/TPY-2, COBRA DANE, and UEWR capabilities through system engineering; software development; and testing support. Modeling and Simulation (M&S) efforts include enhanced sensor models, development of Radio Frequency scene generators, integration of digital simulations into the Ballistic Missile Defense System (BMDS) M&S architecture, and Verification, Validation, and Accreditation of radar models. United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEONS) provides rapid deployment of software upgrades to optimize performance against increasing threats and improve regional integration. This project also funds participation and support for Ballistic Missile Defense System (BMDS) element ground and flight test campaigns and Warfighter games and exercises.

This project will continue development of discrimination advanced algorithms for the AN/TPY-2, COBRA DANE, Sea Based X-Band (SBX), and the UEWR radars to counter evolving threats. The discrimination improvement effort will develop and field integrated Element capabilities to improve BMDS's ability to identify lethal and non-lethal objects. Sensors will continue development of discrimination improvement mid-term design and test support for SBX and far-term trade analysis and planning.

Program Operations provides strategic planning, program integration, cost estimating, contracting, financial management, internal reviews and audits, earned-value management, and program assessments for the program office.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Basic Development Program	26.749	25.004	25.502
Articles:	-	-	-
Description: The Basic Development Program includes development and testing of software maintenance updates to address software trouble reports identified on fielded SW versions and flight/ground test events. Software maintenance updates also includes annual cybersecurity certifications and accreditations, testing for vulnerabilities, and third party assessments of all sensors systems. Software improvement efforts also include optimization of increased processing capabilities. The Basic Development Program also provides analysis of software performance during flight and ground testing of Phased Adaptive Approach (PAA) Phases II and III to conduct Materiel Release Analysis for software delivery. The Materiel Release Closure Plan for the AN/TPY-2 ensures the Reliability, Availability, and Maintainability (RAM) Program promotes reliability growth in the suite of AN/TPY-2 radars via product improvements.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
Specific and/or unique accomplishments to each FY are as follows:				
<p>FY 2018 Plans: -Decrease reflects completion of new software build delivery for AN/TPY-2 that incorporates new development capabilities and repairs for identified software maintenance issues</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
<p>Title: BMDS Radars Modeling & Simulation (M&S)</p> <p align="right">Articles:</p> <p>Description: BMDS Radars M&S efforts include enhanced sensor models, development and maintenance of Radio Frequency (RF) scene generators, integration of digital simulations into the Ballistic Missile Defense System (BMDS), M&S architecture, and Verification, Validation, and Certification (VV&C) of radar models. This effort includes support for technical and performance assessments using Open Systems Architecture Sensor Models (OSM), Open Systems Architecture Signal Injectors (OSI) and other models/tools, as well as development and sustainment of Digital and Hardware in the Loop (HWIL) representations of the tactical versions of AN/TPY-2, SBX, UEWR, and COBRA DANE Upgrade (CDU). This effort includes support for tactical Requirements verification, including development and VV&C of models for testing electronic protection and objective debris mitigation algorithms. This project also supports war games, Warfighter exercises and training, and execution of element-level ground test campaigns to anchor M&S. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: -SEE ABOVE</p> <p>FY 2019 Plans: - SEE ABOVE</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>		23.367 -	24.092 -	23.815 -
<p>Title: Capability Development Program</p> <p align="right">Articles:</p> <p>Description: The Capability Development Program provides engineering support to enable compliance with BMD System Specification threat capabilities and addresses advanced threats prevalent in 2017 and beyond. This task includes the redesign</p>		105.047 -	109.919 -	79.477 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>of select components to address obsolescence and improve reliability of the system. This task initiates electronic protection and objective debris mitigation development efforts to reduce or eliminate the effect of corporate clutter and electronic attack on sensors. This effort develops the Post Intercept Assessment (PIA) capability for the SBX and UEWRs. It develops, designs and tests sensor mid-term discrimination improvements for X-Band radars, to include SBX threat discrimination improvements. It also performs object classification performance updates to UEWR radars. This effort funds participation in far-term discrimination improvement threat model specifications and develops discrimination and countermeasure mitigation capability development. Additional software development activities include support to THAAD Launch on Remote (LoR) capability and X86 performance optimization to enhance processing speed. This effort funds the upgrade of the COBRA DANE Automated Data Processing Equipment (ADPE) suite with modern hardware and software to minimize potential mission failure in the near term and ensure supportability beyond the next five years. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: -Increase reflects initiation of contract through the United States Corps of Engineers to procure, install, and test an Integrated Electronic Security System (IESS) at AN/TPY-2 Forward Based Mode (FBM) Site K. Also includes additional development content associated with active sensor bias monitoring and reporting to support BMDS system track capability. -Complete development and testing of AN/TPY-2 common software that aligns US and FMS software configuration -Initiate studies, evaluations, and systems engineering effort to develop draft element specifications for a potential Atlantic Radar and Medium Range Discriminating Radar (MRDR)</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease in FY 2019 from FY 2018 reflects completion of the production line transition to Gallium Nitride (GaN) next generation Transmit/Receive module technology from Gallium arsenide (GaAs). Also reflects completion of the initial systems engineering effort to develop draft element specifications for the potential Atlantic Radar and completion of COBRA DANE development efforts associated with replacing the ADPE.</p>			
<p>Title: Sensors Directorate Operations</p> <p align="right">Articles:</p> <p>Description: Program Operations provide strategic planning, program integration, cost estimating, contracting, financial management, internal reviews and audits, earned-value management and program assessments for the program office. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p>	71.599 -	65.483 -	66.229 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
- SEE ABOVE				
FY 2019 Plans: - SEE ABOVE				
FY 2018 to FY 2019 Increase/Decrease Statement: N/A				
Title: Upgrade Clear Early Warning Radar		15.287	2.034	6.613
		Articles: -	-	-
Description: Upgrade of Clear Early Warning Radar and Cape Cod Early Warning Radar includes adaptation of hardware and software to UEWR infrastructure, support to BMDS communications and architecture work and installation and at site. This project also includes preparation and removal of legacy equipment at each UEWR site. Specific and/or unique accomplishments to each FY are as follows:				
FY 2018 Plans: -Decrease reflects completion of Clear and Cape Cod Early Warning Radar upgrades				
FY 2019 Plans: -Initiate operations and sustainment activities post operational acceptance to include SATCOM operators and System Administrators				
FY 2018 to FY 2019 Increase/Decrease Statement: Increase in FY 2019 from FY 2018 reflects initial sustainment activities for 2 years post operational acceptance				
Title: United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEONS)		0.000	17.800	5.200
		Articles: -	-	-
Description: Rapid deployment of software upgrades to optimize performance against increasing threats and improve regional integration. Phase 1 provides enhanced discrimination, increases search plan optimization, and updates Position, Navigation, and Timing and Regional Mission Data. Phase 2 will improve debris mitigation to increase raid performance against threats, improve debris tracks on radar resources, and provide search plan upgrades that increase search acquisition and support remote launcher capabilities. Phase 3 provides additional increased search plan capabilities, implementation of the DoD Regional Clock, remote launcher upgrades to integrate AN/TPY-2 with PATRIOT and THAAD systems, and improves proficiencies against advanced threats in complex environments. Specific and/or unique accomplishments to each FY are as follows:				
FY 2018 Plans:				

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
-Complete Phase 2 software upgrades to deliver improved performance, increase battle planning solutions, and increase reliability and availability -Initiate Phase 3 to expand defended areas and increase performance			
<i>FY 2019 Plans:</i> -Complete Phase 3 to utilize the DoD Regional Clock, expand defended areas and increase capabilities against threats, including improved remote launch capabilities -Initiate studies for an alternative radar mission profile and search plans to support regional engagement with THAAD, Aegis and Patriot			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> Decrease in FY 2019 from FY 2018 reflects completion of phase 3			
Accomplishments/Planned Programs Subtotals	242.049	244.332	206.836

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0208866C: O&M	459.556	504.058	499.817	-	499.817	502.663	535.391	525.678	567.815	0.000	3,594.978
• 0208866C: <i>PROCUREMENT</i>	1,585.399	2,417.504	2,432.004	-	2,432.004	1,945.093	1,669.844	1,294.869	1,486.379	0.000	12,831.092
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603898C: <i>Ballistic Missile Defense Joint Warfighter Support</i>	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0604181C: <i>Hypersonic Defense</i>	0.000	75.300	120.444	-	120.444	157.672	142.296	117.381	119.434	0.000	732.527
• 0604673C: <i>Pacific Discriminating Radar</i>	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	186.172	357.659	164.562	-	164.562	91.603	78.112	108.167	133.728	Continuing	Continuing
• 0604879C: <i>Ballistic Missile Defense Sensor Test</i>	81.376	101.839	81.001	-	81.001	77.654	68.026	101.091	81.903	Continuing	Continuing
• 13999903: <i>Planning and Design, Defense Wide</i>	8.233	8.397	8.525	-	8.525	8.822	0.000	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Radar Development Contract (RDC) awarded on Nov 1, 2017 supports the Sensors Directorate's X-Band Radars (XBR). Ballistic Missile Defense System (BMDS) capability and performance requirements, which underpin continuing XBR development requirements include, but are not limited to, the Army/Navy Transportable Radar Surveillance and Control (AN/TPY-2) radar and the Sea-Based X-Band (SBX) radar. These requirements stem directly from formal Warfighter requirements as developed in the United States Strategic Command (USSTRATCOM)-led Warfighter Involvement Process (see USSTRATCOM Special Instruction (SI) 538-3, Missile Defense Warfighter Involvement Process, June 25, 2008). Achievable requirements documented in the Prioritized Capabilities List (PCL) and Modification and Fielding Requirements List (MFRL) are translated via the BMDS architecture and system specifications into flow-down requirements, characteristics, and capability needs for individual BMDS program specifications, and ultimately are approved through the systems engineering and baseline change management process for BMDS programs to execute. The RDC supports the XBRs for product improvement, including developmental upgrades of software and development of hardware and software to meet enhanced capabilities and risk reduction measures; warfighter support, including wargames and exercise support; engineering services, including engineering support for delivered and accepted radars to facilitate maintenance efforts which may include, but are not limited to, hardware obsolescence studies, hardware redesign, technology insertion and refurbishment; BMDS test subject matter expert (SME) support; modeling and simulation SME support; and cybersecurity. These support activities are for all AN/TPY-2 radars, in the Forward Based Mode (FBM) and Terminal Mode (TM), and the SBX Radar to include the Weather Air Search Radar (WxASR) located on the SBX platform.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>
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The BMDS Communications System Complex-Transportable (BCSC-T) Program Plan addresses the design, development, acquisition, testing, integration, activation, and fielding of the BCSC-T. The overall executing agent is the Program Manager Defense Communications and Transmission Systems (PMDCATS). Lockheed Martin Mission Systems (C2BMC prime contractor) via an Other Transaction Agreement provides on-site support.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Basic Development Program - Information Assurance AN/TPY-2	SS/CPAF	Raytheon : MA	15.422	3.531	Nov 2016	3.722	Nov 2017	3.802	Nov 2018	-		3.802	Continuing	Continuing	Continuing
Basic Development Program - Information Assurance SBX	SS/CPAF	Raytheon : MA	0.652	0.203	Oct 2016	0.223	Oct 2017	0.225	Oct 2018	-		0.225	Continuing	Continuing	Continuing
Basic Development Program - Material Release Get Well Plan	SS/CPAF	Raytheon : MA	12.820	1.700	Dec 2016	2.045	Dec 2017	2.082	Dec 2018	-		2.082	Continuing	Continuing	Continuing
Basic Development Program - Prior year Capability Development no longer funded in the FYDP	Various	Various : Various	8.778	0.000		0.000		0.000		-		0.000	0.000	8.778	0.000
Basic Development Program - Sys Integration & Tech Assessments	SS/CPAF	Raytheon : MA/AL	17.220	2.966	Mar 2017	3.273	Mar 2018	2.824	Mar 2019	-		2.824	Continuing	Continuing	Continuing
Basic Development Program - X-Band Software Enhancements/ Development	SS/CPAF	Raytheon : AL	75.623	18.349	Jan 2017	15.741	Jan 2018	16.569	Jan 2019	-		16.569	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - M&S Development	SS/CPFF	Raytheon, Northrup Grumman : MA, CO	116.552	14.475	Nov 2016	17.058	Nov 2017	16.656	Nov 2018	-		16.656	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - VV&A of Models	MIPR	AMRDEC : AL	41.388	6.893	Dec 2016	5.037	Dec 2017	5.124	Dec 2018	-		5.124	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - Warfighter Exercises	SS/CPFF	Raytheon : MA	8.341	1.999	Feb 2017	1.997	Feb 2018	2.035	Feb 2019	-		2.035	Continuing	Continuing	Continuing
Capability Development Program - AN/TPY-2 Capability Development	SS/CPAF	Raytheon : MA	84.518	40.421	Oct 2016	34.940	Oct 2017	24.012	Nov 2018	-		24.012	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Capability Development Program - AN/TPY-2 GaN TTP	SS/CPAF	Raytheon : MA	4.878	9.842		10.200	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Atlantic Radar Study	MIPR	JHU/APL, NSWC, MDA : AL	0.000	0.000		5.000	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - COBRA DANE Upgrades	TBD	TBD : TBD	0.000	16.000	Apr 2017	5.000	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Electronic Protection	SS/CPAF	Raytheon, GTRI : MA, GA	4.625	10.272	Oct 2016	7.659	Oct 2017	8.911	Oct 2018	-		8.911	Continuing	Continuing	Continuing
Capability Development Program - Enhanced Discrimination	C/CPAF	USAF, Raytheon : Hanscom AFB MA	73.757	26.061	Jan 2017	24.900	Nov 2017	24.854	Jan 2019	-		24.854	Continuing	Continuing	Continuing
Capability Development Program - Homeland Defense Radar - Hawaii (HDR-H) Studies and Analysis	MIPR	JHU/APL, NSWC, MDA : MD, AL, VA	0.000	2.451	Jan 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Homeland Defense Radar - Pacific (HDR-P) Study	MIPR	JHU/APL, NSWC, MDA : MD, VA, AL	0.000	0.000		5.000	Feb 2018	5.000	Feb 2019	-		5.000	Continuing	Continuing	Continuing
Capability Development Program - Integrated Electronic Security System (IESS) Site K	MIPR	US Corps of Engineers : Germany	0.000	0.000		6.820	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Post Intercept Assessment (PIA)	C/CPAF	Raytheon : MA	0.000	0.000		10.400	Jan 2018	6.700	Dec 2018	-		6.700	Continuing	Continuing	Continuing
Capability Development Program - Prior year	Various	Various : Various	22.753	0.000		0.000		0.000		-		0.000	0.000	22.753	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Capability Development no longer funded in the FYDP															
Capability Development Program - SBX Capability Development	SS/CPAF	Raytheon : MA	0.000	0.000		0.000		7.000	Jan 2019	-		7.000	Continuing	Continuing	Continuing
Capability Development Program - UEWR Capability Development	SS/CPAF	Raytheon : MA	0.000	0.000		0.000		3.000	Jun 2019	-		3.000	Continuing	Continuing	Continuing
Sensors Directorate Operations - Army Hybrid Program Office	MIPR	SMDC : AL	4.718	1.250	Dec 2016	1.865	Dec 2017	2.038	Dec 2018	-		2.038	Continuing	Continuing	Continuing
Sensors Directorate Operations - Govt Salaries, Travel, Training (MDA Sensors)	Various	MDA : AL, VA, MA	132.828	24.029	Oct 2016	22.026	Oct 2017	22.003	Oct 2018	-		22.003	Continuing	Continuing	Continuing
Sensors Directorate Operations - MiDAESS, FFRDC/UARC	SS/CPAF	CSS, APL, LL, OGA, GTRI, MITRE : AL, MA, VA, MD, GA	252.418	38.789	Jan 2017	32.431	Nov 2017	33.431	Nov 2018	-		33.431	Continuing	Continuing	Continuing
Sensors Directorate Operations - Network and Infrastructure Services	C/CPAF	Northrop Grumman/ IJacobs Eng : AL, AK, CA, CO, HI, NM, VA	30.899	4.684	Feb 2017	6.205	Feb 2018	6.056	Feb 2019	-		6.056	Continuing	Continuing	Continuing
Sensors Directorate Operations - Other Govt Agencies	MIPR	SMDC/AL, Hanscom AFB : MA	29.546	2.847	Feb 2017	2.956	Feb 2018	2.701	Feb 2019	-		2.701	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - BCN Upgrades	MIPR	MDA C2BMC / DISA : MA, AK	18.303	0.330	Jun 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - Facilities Site Activation/Admin Comms	MIPR	MDA C2BMC : MA, AK	6.252	1.197	Nov 2016	0.000		5.282	Dec 2018	-		5.282	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Upgrade Clear Early Warning Radar - GMD Fire Control Integration	SS/CPAF	Boeing/AK/AL, Raytheon : MA	5.527	0.383	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - Prior year Upgrade Clear Early Warning Radar no longer funded in the FYDP	Various	Various : Various	9.218	0.000		0.000		0.000		-		0.000	0.000	9.218	0.000
Upgrade Clear Early Warning Radar - Radar Upgrade -- Prime Contractor	C/CPAF	Raytheon : MA	109.007	13.377	Jan 2017	2.034	Jan 2018	1.331	Jan 2019	-		1.331	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEONS) - Software Enhancements/ Development	C/CPAF	Raytheon : MA	0.000	0.000		17.800	Jan 2018	5.200	Jan 2019	-		5.200	Continuing	Continuing	Continuing
Subtotal			1,086.043	242.049		244.332		206.836		-		206.836	Continuing	Continuing	N/A

Remarks
Note: Clear Early Warning Upgrade Program includes upgrade of the Cape Cod EWR.

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
Operations and sustainment of Upgraded Early Warning Radar (UEWR), COBRA DANE (CD), and Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) Radars Contract Logistics Support (CLS) are Operations and Maintenance (O&M) Defense-Wide appropriations and are described in the Missile Defense Agency (MDA) O- Documents.

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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,086.043	242.049	244.332	206.836	-	206.836	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>
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	Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆											
	Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇											
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
IMTP v19.1 war game and exercise event details are at a higher classification.	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
SNG-A-D-1				◆																								
SNG-U-H-1				◆																								
SNG-C-D-2								◇																				
SND-A-H-2								◇																				
SNG-U-D-2								◇																				
SNG-S-H-2								◇																				
SNG-C-H-3												◇																
SNG-S-D-3																◇												
SNG-U-H-4																											◇	
SNG-A-D-4																												◇
SNG-C-D-3																												◇
SNG-A-H-4																												◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD11 / <i>BMDS Radars</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 war game and exercise event details are at a higher classification.	1	2017	4	2023
SNG-A-D-1	2	2017	2	2017
SNG-U-H-1	3	2017	3	2017
SNG-C-D-2	1	2018	1	2018
SND-A-H-2	1	2018	1	2018
SNG-U-D-2	1	2018	1	2018
SNG-S-H-2	1	2018	1	2018
SNG-C-H-3	2	2018	2	2018
SNG-S-D-3	3	2018	3	2018
SNG-U-H-4	2	2023	2	2023
SNG-A-D-4	3	2023	3	2023
SNG-C-D-3	3	2023	3	2023
SNG-A-H-4	4	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>			Project (Number/Name) MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD41: <i>Homeland Defense Radar - Hawaii (HDR-H)</i>	-	0.000	21.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
Beginning in FY 2018 funding is requested to establish the Pacific Radar Budget Project (MD41).
Beginning in FY 2019 the Budget Project (MD41) title will change from Pacific Radar to Homeland Defense Radar - Hawaii (HDR-H)

Beginning in FY 2019 the Homeland Defense Radar - Hawaii (HDR-H) will be realigned to the Pacific Discriminating Radar Program Element 0604673C, Project MD41, from Ballistic Missile Defense Sensors Program Element 0603884C, Project MD41.

A. Mission Description and Budget Item Justification

The mission of the Homeland Defense Radar - Hawaii (HDR-H) program office is to define, develop, acquire, field, and sustain the radar as an element of the BMDS. The initial fielding of Configuration 1 is planned for FY 2023 with an Operational Capability Declaration projected in the FY 2025 time-frame. The HDR-H provides persistent midcourse discrimination, precision tracking, and hit assessment to support the defense of Hawaii against long-range missile threats. The HDR-H is comprised of an equipment shelter, a Mission Control Facility (MCF) which supports radar operations, and supporting facilities and infrastructure.

The HDR-H will be integrated into the BMDS through the C2BMC system and will feature a scalable and open system architecture to mitigate evolving threats. The radar also supports additional mission areas including Space Situational Awareness.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Homeland Defense Radar - Hawaii (HDR-H)	0.000	21.000	0.000
Articles:	-	-	-
Description: The HDR-H program, previously Pacific Radar, includes requirements development activities associated with systems engineering, hardware and software development, discrimination improvements, design reviews, testing, and Models and Simulation (M&S) efforts for radar development. Efforts include site activation and preparation of site infrastructure for construction activities and completion of formal environmental impact statements. The program will develop and integrate C2BMC systems for HDR-H functionality. The program will develop and deliver radar software Build 1 and establish the Independent Verification and Validation (IV&V) lab for testing of operational software. The program includes purchase, manufacture, and test of long lead components. Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
-Complete environmental, geotechnical, and other studies for environmental compliance and inform military construction (MILCON) design efforts -Initiate prime contract award and developmental engineering for radar hardware, software and equipment shelter -Initiate preparation for the HDR-H System Requirements Review (SRR) -Initiate preparation of the HDR-H Integrated Baseline Review (IBR)			
<i>FY 2019 Plans:</i> -Decrease in FY 2019 from FY 2018 reflects the Homeland Defense Radar - Hawaii (HDR-H) realignment to the Pacific Discriminating Radar Program Element 0604673C, Project MD41, from Ballistic Missile Defense Sensors Program Element 0603884C, Project MD41			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> Decrease in FY 2019 from FY 2018 reflects the Homeland Defense Radar - Hawaii (HDR-H) realignment to the Pacific Discriminating Radar Program Element 0604673C, Project MD41, from Ballistic Missile Defense Sensors Program Element 0603884C, Project MD41.			
Accomplishments/Planned Programs Subtotals	0.000	21.000	0.000

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>SENSORS MILCON</i>	166.670	0.000	174.000	-	174.000	0.000	0.000	0.000	0.000	0.000	340.670
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0604673C: <i>Pacific Discriminating Radar</i>	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537
• 31299903: <i>MILCON PLANNING and DESIGN</i>	15.000	0.000	14.184	-	14.184	49.482	38.424	8.009	8.160	0.000	133.259

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>

D. Acquisition Strategy

The HDR-H acquisition strategy was approved in December 2017. The HDR-H procurement will be the first delivery order of a multi-radar IDIQ contract that will include the full/open competitive award for the HDR-H. Additional radar delivery orders will be awarded based on competitively priced common hardware and software components plus site specific shelter and integration scope. MDA plans to award the HDR-H by 4Q FY 2018 and the prime contractor will manage, develop, build and integrate, test, and field the radar. The prime contract will include other fixed price and cost-reimbursable line items and options in order to properly balance acquisition costs and risks. Performance and cost incentives will be included to motivate contractor performance. The radar prime contractor will deliver a full technical data package, which will enable the government to effectively and affordably sustain the system. The HDR-H is expected to complete DD250 and initial fielding in FY 2023.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Homeland Defense Radar - Hawaii (HDR-H) - Prime Contractor	TBD	TBD : TBD	0.000	0.000		18.000	Jun 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Homeland Defense Radar - Hawaii (HDR-H) - Program Office	Various	MDA : AL	0.000	0.000		3.000	Jun 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		21.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	21.000	0.000	-	0.000	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>
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	Significant Event Complete ▲			Milestone Decision Complete ★			Element Test Complete ◆			System Level Test Complete ●			Complete Activity ◆								
	Significant Event Planned △			Milestone Decision Planned ☆			Element Test Planned ◇			System Level Test Planned ○			Planned Activity ◇								
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
Homeland Defense Radar - Hawaii (HDR-H) Development							◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
System Requirements Review (SRR)									△												
Preliminary Design Review (PDR)												△									
Developmental Baseline Review (DBR)												△									
Critical Design Review (CDR)															△						
DD-250																					△
Initial Fielding																					△

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Homeland Defense Radar - Hawaii (HDR-H) Development	3	2018	4	2023
System Requirements Review (SRR)	3	2019	3	2019
Preliminary Design Review (PDR)	3	2020	3	2020
Developmental Baseline Review (DBR)	4	2020	4	2020
Critical Design Review (CDR)	1	2021	1	2021
DD-250	3	2023	3	2023
Initial Fielding	4	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MC11 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC11: <i>Cyber Operations</i>	3.871	1.230	3.636	1.079	-	1.079	7.788	4.368	1.145	1.168	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The funds in this project will be utilized to complete transitioning to and the sustainment of the new DoDI 8510.01 Risk Management Framework (RMF) for DoD Information Technology (IT) requirement for the MDA Sensors Directorate and conduct Security Control Assessments (SCA) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plans of Action and Milestones for MDA Sensors mission systems. It also includes support for external cybersecurity assessments and penetration testing of the Sensors mission systems, both in laboratory Element Cybersecurity Experiments and in ground test activities, in accordance with the Director, Operational Test and Evaluation (DOT&E) directive and the Integrated Master Test Plan (IMTP). It maintains the Assessment and Authorization (A&A) data repository, capturing the RMF documentation (artifacts, validation results, Cybersecurity Risk Assessment results, cybersecurity scorecard, and Authorizing Official (AO) authorization decisions) and POA&M for all MDA information systems.

This project supports the monitoring, prioritization, and tracking of Cybersecurity mitigation detailed in Information Technology security POA&Ms. The activities include preparation of A&A documentation and accreditation recommendations to the MDA Senior Information Security Officer (SISO)/Security Control Assessor (SCA) and Authorizing Official (AO). Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission; test; and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Network / System Assessment and Authorization (A&A)	1.230	3.636	1.079
Articles:	-	-	-
Description: Cyber Operations funds Sensors Directorate Information System Security Manager (ISSM) civilian salaries and cybersecurity engineering and architecture planning for program information technology systems. This project plans and tests the cybersecurity controls for the BMDS and maintains Sensors Risk Management Framework (RMF) authorizations for Sensors-managed information systems, conducts Controls Validation Testing (CVT)/ Security Controls Assessment (SCA) of sensors mission and support systems and provides and maintains Plans of Action and Milestones to mitigate cybersecurity deficiencies. Effort also funds the maintenance of existing. DoD Information Assurance Certification and Accreditation Process (DIACAP) certification and accreditation packages until the transition to RMF is complete in FY 2018. Cyber Operations conducts annual cybersecurity program reviews on the Sensors enclaves to assess compliance in implementing and maintaining controls. Specific and/or unique accomplishments to each FY are as follows:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MC11 / <i>Cyber Operations</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<i>FY 2018 Plans:</i> - Initiate of cybersecurity supply chain compliance			
<i>FY 2019 Plans:</i> - SEE ABOVE.			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> Decrease in FY 2019 from FY 2018 reflects the completion of the cybersecurity supply chain compliance			
Accomplishments/Planned Programs Subtotals	1.230	3.636	1.079

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603898C: <i>Ballistic Missile Defense Joint Warfighter Support</i>	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	186.172	357.659	164.562	-	164.562	91.603	78.112	108.167	133.728	Continuing	Continuing
• 0604879C: <i>Ballistic Missile Defense Sensor Test</i>	81.376	101.839	81.001	-	81.001	77.654	68.026	101.091	81.903	Continuing	Continuing
• 0901598C: <i>Management HQ - MDA</i>	30.693	29.947	28.626	-	28.626	27.276	27.894	28.466	29.005	Continuing	Continuing
• 13999903: <i>Planning and Design, Defense Wide</i>	8.233	8.397	8.525	-	8.525	8.822	0.000	0.000	0.000	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency			Date: February 2018		
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>		Project (Number/Name) MC11 / <i>Cyber Operations</i>	

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MC11 / <i>Cyber Operations</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network / System Assessment and Authorization (A&A) - CND/IA Advisory and Assistance Services (Booz Allen)	C/CPFF	Booz Allen Hamilton : AL, CO, VA	2.018	0.674	Nov 2016	0.538	Nov 2017	0.509	Nov 2018	-		0.509	Continuing	Continuing	Continuing
Network / System Assessment and Authorization (A&A) - CND/IA Advisory and Assistance Services (Torch Technologies)	C/CPFF	Torch Technologies : AL, CO, VA	1.300	0.354	Jan 2017	0.353	Jan 2018	0.385	Jan 2019	-		0.385	Continuing	Continuing	Continuing
Network / System Assessment and Authorization (A&A) - Civilian Salaries	Various	MDA : AL, CO, VA	0.553	0.202	Oct 2016	0.176	Oct 2017	0.185	Oct 2018	-		0.185	Continuing	Continuing	Continuing
Network / System Assessment and Authorization (A&A) - Cybersecurity Supply Chain Compliance	SS/CPAF	Raytheon : MA	0.000	0.000		2.569	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			3.871	1.230		3.636		1.079		-		1.079	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.871	1.230	3.636	1.079	-	1.079	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MC11 / <i>Cyber Operations</i>
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	Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆															
	Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇															
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
Transition to Cyber Security Risk Management Framework (CRMF)	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Information Assurance Certification and Accreditation (C&A) Package Preparation / Submission	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Cyber Security Program Policy / Risk Management	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Cyber Security Mitigation Monitoring and Tracking	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
BMDS Cyber Security Policy Development	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MC11 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Transition to Cyber Security Risk Management Framework (CRMF)	1	2017	4	2023
Information Assurance Certification and Accreditation (C&A) Package Preparation / Submission	1	2017	4	2023
Cyber Security Program Policy / Risk Management	1	2017	4	2023
Cyber Security Mitigation Monitoring and Tracking	1	2017	4	2023
BMDS Cyber Security Policy Development	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	75.992	9.386	9.177	12.961	-	12.961	15.561	21.828	22.410	21.127	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support reflects proportional changes as a result of budget changes in the Ballistic Missile Defense Sensors program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	9.386	9.177	12.961
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	9.386	9.177	12.961

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	8.022	0.192	Jul 2017	0.184	Jul 2018	0.075	Jul 2019	-		0.075	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	MIPR	Various : Multi: AL, CO, NM, VA, Various	8.251	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi:AL,VA	11.077	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (Reqn)	Reqn	Department of Labor : Washington, DC	0.170	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CO, CA, VA	42.217	8.943	Aug 2017	8.641	Aug 2018	12.886	Mar 2019	-		12.886	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support civilian Salaries, Travel, Training	Allot	MDA : Multi:AK, AL,CA, CO, VA	3.938	0.251	Nov 2016	0.352	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	C/CPAF	JRDC : JRDC	0.587	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various : Multi: AL, CO, CA, VA	1.730	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			75.992	9.386		9.177		12.961		-		12.961	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency								Date: February 2018			
Appropriation/Budget Activity 0400 / 4			R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>				Project (Number/Name) MD40 / <i>Program-Wide Support</i>				
	Prior Years	FY 2017	FY 2018		FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals	75.992	9.386	9.177		12.961	-	12.961	Continuing	Continuing	N/A	

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																				
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																				
					FY 2017		FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
MD40 Program-Wide Support					◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603890C / <i>BMD Enabling Programs</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,702.637	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
MD24: <i>System Engineering & Integration</i>	640.571	150.748	166.558	170.348	-	170.348	156.422	151.341	148.663	158.262	Continuing	Continuing
MT23: <i>Enabling - Test</i>	34.268	17.187	22.767	39.288	-	39.288	20.666	21.328	21.081	21.373	Continuing	Continuing
MD28: <i>Intelligence & Security</i>	147.039	44.696	44.708	44.078	-	44.078	47.226	46.859	47.581	48.905	Continuing	Continuing
MD30: <i>BMD Information Management Systems</i>	325.017	84.671	84.499	79.979	-	79.979	88.786	87.686	90.970	93.890	Continuing	Continuing
MC30: <i>Cyber Operations</i>	58.697	43.589	41.458	63.112	-	63.112	66.286	72.775	68.150	56.599	Continuing	Continuing
MD31: <i>Modeling & Simulation</i>	165.404	46.513	49.824	89.786	-	89.786	97.004	135.297	48.670	49.030	Continuing	Continuing
MC31: <i>Engineering Cyber Operations</i>	0.817	2.980	3.838	4.466	-	4.466	11.564	34.665	10.697	13.383	Continuing	Continuing
MD32: <i>Quality, Safety, and Mission Assurance</i>	206.246	29.813	30.516	29.319	-	29.319	31.135	30.766	31.398	32.286	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	124.578	15.006	21.474	20.550	-	20.550	23.237	27.493	22.427	22.585	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$1.100 million to address emergency warfighting requirements in support of a Joint Emergent Operational Need. Additional details are available at a higher classification level. This is a base budget requirement.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENT (MDDE) BUDGET AMENDMENT: +\$16.200 million is required to address emergency warfighting requirements in support of USFK Joint Emergent Operational Need Statement (JEON). Additional details are available at a higher classification level.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System (BMDS) Enabling Programs provide critical products and processes needed to combine element missile defense systems into a single, integrated and layered BMDS to provide new defensive capabilities and evaluate existing capabilities against the emerging threats. Specifically, the Enabling Programs:

- Define BMDS architectures and functional requirements, conduct Analyses of Alternatives (AoA) for the DoD, and provide engineering requirements, execution support, and pre- and post-mission analysis for BMD System tests
- Provide validated models and simulations for BMD System assessment

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603890C / <i>BMD Enabling Programs</i>
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- Assess BMDS performance and deliver capabilities to the Warfighter
- Provide multi-disciplinary security and intelligence support for BMDS acquisition, development, test, and deployment
- Identify potential threats and vulnerabilities to MDA and the BMDS and develop and implement strategies to mitigate those risks
- Assess architecture alternatives to address advanced threats and provide recommendations for future BMDS configurations to keep pace with evolving threats
- Provide Information Management tools and products supporting the development of BMDS capabilities while safeguarding networks and critical program information
- Provide MDA secure communication networks, IT systems, special purpose processing nodes, operations and monitoring centers, and disaster recovery and continuity of operations requirements
- Evaluate quality, technical safeguards, and mission assurance effectiveness
- Assess System ability to maintain integrity and superiority with advances in technology development

This Program Element includes BMDS threat discrimination improvements, which will enhance BMDS effectiveness against the evolving adversary threat. The end result will be a BMDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and more efficiently using interceptor inventory. BMDS threat discrimination improvements are funded from the Enabling (0603890C), Midcourse (0603882C), BMD Sensors (0603884C), BMD Command, Control, Battle Management and Communications (C2BMC) (0603896C), and Aegis BMD (0603892C) PEs.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	408.594	449.442	466.760	-	466.760
Current President's Budget	435.203	465.642	540.926	-	540.926
Total Adjustments	26.609	16.200	74.166	-	74.166
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	25.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	9.985	0.000			
• SBIR/STTR Transfer	-9.476	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	1.100	16.200	0.000	-	0.000
• Other Adjustment	0.000	0.000	74.166	-	74.166

Change Summary Explanation

The increase in FY 2019 from PB18 to PB19 supports emerging Department of Defense priorities, including capability enhancements to address USFK Joint Emergent Operational Need; establishing a continuous integration and agile ground testing capability; enhanced modeling and simulation in support of BMD System Assessment to give Warfighters confidence in BMDS performance; enhanced Verification, Validation, and Accreditation (VV&A) to provide confidence in

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	PE 0603890C / <i>BMD Enabling Programs</i>

BMDS modeling and simulation results; and the consolidation of cybersecurity investments to implement the Office of the Secretary of Defense four lines of effort and Risk Management Framework (RMF) activities across MDA programs.

FY 2017 CONGRESSIONAL ADDS: +25.000 million is a Congressional add for Cybersecurity training and enhancements and cybersecurity investments for Secretary of Defense priority effort in the Cybersecurity Four Lines of Effort.

FY 2017 MISSILE DEFEAT ENCHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$1.100 million to address emergency warfighting requirements in support of a Joint Emergent Operational Need. Additional details are available at a higher classification level. This is a base budget requirement.

FY 2017 OTHER ADJUSTMENTS: +\$9.985 million reflects MDA realignments to support acceleration of systems engineering efforts to address analysis of emerging BMD threats, filtering and tracking capabilities, and spaced-based architecture alternatives.

FY 2018 MISSILE DEFEAT AND DEFENSE ENCHANCEMENT (MDDE) BUDGET AMENDMENT: +\$16.200 million is required to address emergency warfighting requirements in support of USFK Joint Emergent Operational Need Statement (JEON). Additional details are available at a higher classification level.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs				Project (Number/Name) MD24 / System Engineering & Integration			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD24: System Engineering & Integration	640.571	150.748	166.558	170.348	-	170.348	156.422	151.341	148.663	158.262	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The System Engineering & Integration (SE&I) workforce, including Industry and Contractor Support Services (CSS), defines, designs, tests and integrates the BMDS, and provides analysis, decision support and planning activities for real-world operations to the National Command Authority, Joint Staff, Military Services, Combatant Commanders, Operational Test Agencies, Director of Operational Test and Evaluation, Allies, and others.

The SE&I Major Program Goals are:

- Plan, design, develop, integrate, and test a layered BMDS that provides the required BMD performance
- Provide system-level engineering support to the BMDS Elements, and lead collaborative cross-Element, cross-Component engineering
- Lead the engineering required to achieve Enhanced Homeland Defense capability
- Develop architectures and requirements to respond to the proliferation of short and medium range ballistic missiles
- Provide a more effective missile defense capability for U.S. deployed forces, allies, and partners, and enhance homeland defense
- Develop discrimination improvements for the Homeland and Regional Defense missions
- As technical authority for Integrated Air and Missile Defense (IAMD), provide a consistent, disciplined systems engineering process using a multi-Service team to integrate Joint IAMD systems
- Provide technical direction to Element and Component developers and provide System-level forums to track, assess, and improve hardware and software reliability
- Identify BMDS capabilities and limitations
- Develop performance assessment requirements, verify BMDS performance through testing, and conduct assessments to form the basis for technical capability declarations in support of fielding decisions
- Identify Critical Engagement Conditions and data required to develop the test campaigns to demonstrate BMDS performance
- Define the test objectives necessary to anchor BMDS-level models and simulations, enable independent verification and validation
- Identify System issues occurring in ground and flight tests and lead the effort to resolve them
- Analyze architecture alternatives and new technologies to establish technical roadmaps for future capabilities
- Ensure the BMDS is complementary to and interoperable with NATO and other theater systems
- Develop anti-tamper approaches to enable international fielding of the BMDS

The BMDS discrimination improvements effort will develop and field integrated Element capabilities to improve the BMDS ability to identify lethal and non-lethal objects. SE&I will conduct BMDS performance analysis and engineering to specify the BMDS requirements and interfaces to achieve the improved capability.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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Title: Requirements and Design	32.395	34.118	31.223
Articles:	-	-	-

Description: The Requirements and Design effort develops the BMD System level requirements and specifications for the Phased Adaptive Approach (PAA) Phases and beyond, and drives the integration of the BMDS. Requirements and Design allocates requirements to BMDS Elements and adjudicates Element level specifications to provide required capabilities for the Warfighter.

- Define BMDS technical content expectations and develop system requirements.
- Develop and allocate functional performance, interface, and design suitability requirements to Programs, in collaboration with BMDS element engineers.
- Deliver system technical baseline updates to document integrated system build content as identified in the R4 summary.
- Identify and resolve technical disconnects through the requirements trace process and element certifications; conduct engineering analyses and perform trade studies.
- Participate in Element Requirements Reviews.
- Develop Specification Change Notices (SCN) for future requirements changes, to include mitigation strategies to address BMDS Discrepancy Reports.
- Ensure reporting of Element functionality and software / hardware integration in the BMDS Accountability Report (BAR) and Director's Program Reviews.
- Assess and add emerging threats to MDA's lethality prediction models.
- Incorporate updates to lethality assessments, collateral effects, and consequences of intercept into the BMDS Lethality Program Plan.

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:

- FY 2018 increase is due to requirements and design work required to incorporate Post Intercept Assessment (PIA) into the BMDS.
- Define BMDS technical content expectations and develop system requirements, to include integration of new capabilities, such as Overhead Persistent Infrared (OPIR) interfaces and improved regional sensor discrimination
 - Develop requirements for Additional Protection Techniques.
 - Conduct initial experimentation for Post Intercept Assessment (PIA).
 - Refine approach to implement and assess BMD System Track capability.
 - Assure the successful integration of evolving DoD Position, Navigation, and Timing services into the BMDS.

FY 2019 Plans:

- Complete system requirements and interface definition for the Homeland Defense Radar in Hawaii.

FY 2018 to FY 2019 Increase/Decrease Statement:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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N/A

Title: Integrated Air and Missile Defense (IAMD)	19.292	16.911	16.996
Articles:	-	-	-

Description: The IAMD effort provides a consistent, disciplined systems engineering process using a joint service systems engineering team to develop the technical requirements necessary to support integration of joint service IAMD systems, implementing capabilities required by the Geographic Combatant Commands. This effort includes systems engineering analysis, development of technical and interface control requirements and documents, definition of candidate Joint IAMD increments, and configuration control across the joint systems. IAMD provides improved performance such as an improved air picture to enable engagement coordination decision making, increase battlespace, and improve track continuity. Additional efforts will address critical joint Command and Control and interoperability needs such as integrated fire control.

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:

- Update IAMD M&S capabilities to support requirements development for the option(s) selected at the improved air picture Alternative System Review
- Continue to conduct additional systems engineering and prototyping to address issues uncovered for IAMD Increment 1
- Conduct Joint IAMD System Requirements Reviews with the affected service systems to incorporate IAMD Increment 1 capability
- Improve upon the IAMD joint system architecture description by incorporating IAMD Increment 2 capabilities such as Combat Identification and/or planning capabilities as appropriate
- Continue to conduct long-range planning for future capability increments

FY 2019 Plans:

- Continue IAMD Increment 2 engineering efforts:
- Develop Combat Identification models and conduct analyses
- Develop Joint Force Planner options
- Work with the Combatant Commands, Joint Staff, and Services to understand and prioritize existing and emerging capability gaps
- Conduct studies and analysis to assess and advocate for the development of technologies to address these technical gaps
- Monitor and assess the implementation of technical requirement compliance within Service and MDA Programs of Record
- Conduct long-range planning for future capabilities

FY 2018 to FY 2019 Increase/Decrease Statement:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
N/A			
<p>Title: System-Level Verification and Assessment</p> <p align="right">Articles:</p> <p>Description: This activity funds BMD System Assessment and Verification, Validation, and Accreditation (VV&A) activities to support BMDS Operational Capacity Baseline (OCB) delivery decisions and Technical Capability Declarations (TCDs), and anchor System modeling & simulation.</p> <ul style="list-style-type: none"> - Develop and manage assessment plans and requirements for BMDS capability increments: <ul style="list-style-type: none"> -- Map assessment requirements to data collection venues (i.e., ground tests, flight tests, and exercises). -- Evaluate current Modeling & Simulation (M&S) capability to address assessment requirements, and provide recommendations for new or improved M&S. - Maintain assessment documentation per the R4 summary. - Conduct extensive analysis of data collected in BMDS ground and flight test events, instrumental to understanding BMDS interoperability and performance, and anchoring models and simulations. - Identify mitigation approaches for system performance issues uncovered during the course of analysis and assessment. - Monitor development and recommend improvements to the simulation enterprise based on an evaluation of the validity of Component, Element and System-level models (and frameworks) and participation in assessment activities and Modeling and Simulation events. - Conduct assessments of BMD System capabilities and limitations prior to capability delivery decisions. - Produce independent assessments of each incremental BMDS Capability Delivery to support fielding readiness determinations. - Verify BMDS performance against specified requirements, and produce BMDS verification status reports. - Maintain M&S VV&A database and toolkit. - Maintain verification data for BMD System Specification Change Notices. - Recommend solutions to improve assessment confidence, including M&S and testing issue resolutions. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: FY 2018 increase is based on additional work required to implement Operational Test Agency (OTA) Accreditation Plan.</p> <ul style="list-style-type: none"> - Conduct system assessment in support of BMDS EPAA Phase 3 TCD. - Develop assessment plans and requirements for BMDS 2020 Homeland Defense and Mid-term Discrimination Improvements. - Implement the BMDS OTA Accreditation Plan by generating additional VV&A evidence to meet M&S accreditation requirements for ground tests in support of BMDS TCDs and Operational Acceptance. <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Complete system assessment in support of BMDS EPAA Phase 3 TCD. 	15.196	18.462	28.758
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Increase verification documentation and analyze additional performance parameters for each BMDS model. - Improve VV&A process for M&S used in ground tests, per MDA-BMDS OTA joint prioritized M&S limitations list -- Develop new analysis tools to verify that the Objective Simulation Framework correctly presents threat data to all Element M&S -- Develop threat implementation verification reports for all Element M&S -- Conduct verification and validation for additional environmental models -- Identify root cause for and resolve sensor model track accuracy issues - Continue analysis of tactical system outputs to increase confidence in ground test data <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects an increased effort to address shortcomings outlined in yearly DOT&E reporting and provide additional confidence in BMDS performance to the Warfighter.</p> <p>Title: Knowledge Centers</p> <p align="right">Articles:</p> <p>Description: Knowledge Centers serve as independent technical advisors to BMDS program offices in the C2BMC, Interceptor, Space, and Sensor areas to support development of technical approaches and improve reliability.</p> <ul style="list-style-type: none"> - Provide Federally Funded Research and Development Centers (FFRDC) and University Affiliated Research Centers (UARC) subject matter expertise, to include reach-back capability as needed, for Element program managers: -- Provide Subject Matter Expertise and analytical support for Independent Review Teams, mission assurance assessments, Failure Review Boards and Failure Investigation Teams -- Identify and provide recommendations to mitigate technical risks, including innovative and unconventional approaches -- Promote knowledge sharing between external technical sources and MDA. - Perform independent technical assessments of critical BMDS and Element program issues: -- Define element knowledge points (KPs), establish closure criteria, and provide closure recommendations -- Continue to provide BMD System and Element performance assessments. - Conduct assessments of emerging technologies as required. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p>	14.142	15.469	14.819
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
N/A			
<p>Title: Future Concepts and Planning</p> <p align="right">Articles:</p> <p>Description: This activity funds BMDS architecture and future concept development, and efforts and studies to address the BMDS emergent threat, including DoD Analyses of Alternatives (AoA).</p> <ul style="list-style-type: none"> - Perform BMDS capability gap analysis, and analyze and document architecture alternatives and/or new technologies to address gaps - Develop Initial Requirements Documents (IRDs) to establish functional, performance and integration planning requirements for next generation BMD weapons and sensors - Identify architecture alternatives that improve BMDS performance and are complementary to and interoperable with North Atlantic Treaty Organization (NATO) systems and theaters around the world - Conduct technology development reviews for future/follow-on BMDS Element development efforts. - Update concept capability documentation based on architectural options, trade studies, and technology development experiments. - Maintain and update Phased Implementation Plan to document integrated requirements for improvements to, or augmentations of, current system capabilities. - Develop Preliminary Specification Change Notices for selected future BMDS capabilities and technologies. - Maintain a dialog with the warfighter community for all BMDS engineering and technical issues -- Inform Warfighter development of the Prioritized Capabilities List (PCL) by providing relevant BMD System data -- Develop updates to the Achievable Capabilities List (ACL) as required - Lead collaborative effort to improve foreign partners' understanding of existing system capabilities, architectural performance and operational concepts of the BMDS <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <p>FY 2018 decrease reflects transfer of Hypersonic Defense activities to Project MD29, Hypersonic Defense, in PE 0604181C.</p> <ul style="list-style-type: none"> - Conduct activities listed in Description section (SEE ABOVE). - Participate in designated OSD activities or analyses, as directed by Congress - Conduct analyses of architecture alternatives, including: <ul style="list-style-type: none"> -- Space sensor technologies -- Boost phase concepts <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Participate in designated OSD activities or analyses, as directed by Congress - Conduct analyses of architecture alternatives, including: 	22.370	13.120	12.988
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
-- Directed energy technologies -- Improvements recommended by the Ballistic Missile Defense Review (BMDR) FY 2018 to FY 2019 Increase/Decrease Statement: N/A				
Title: Systems Engineering, Engineering Analysis and Quick Response Team Articles: Description: This task provides rapid response, high quality systems engineering analysis products and supporting technical data to address external and internal Agency inquiries and decisions: - Conduct system level analyses to support ongoing BMDS Architecture and Systems Engineering efforts. - Analyze expected performance of BMDS Architecture options: -- Analyze and predict the performance of future BMDS capabilities -- Provide technical assessments, and collaborate with BMDS Elements to define and track technical performance measures. - Respond to Warfighter, Combatant Command (CCMD) and Congressional requests for information and analysis (RFIs/RFAs) - Provide analytical support for real-world events. - Maintain analysis parameters database and standards per the R4 summary to ensure consistency. - Develop analytical data to respond to information requests from MDA and DoD leadership. Specific and/or unique accomplishments to each FY are as follows: FY 2018 Plans: - SEE ABOVE. FY 2019 Plans: - SEE ABOVE. FY 2018 to FY 2019 Increase/Decrease Statement: N/A		9.865	10.620	10.690
		-	-	-
Title: Discrimination Articles: Description: For Mid-term and Far-term discrimination, SE&I will establish performance goals for the technology development phase; develop functional, performance, and interface requirements to address the Mid-term and Far-term threat sets. SE&I will establish ground and flight test requirements for the Mid-term and Far-term phases, and generate threat data to support analysis and testing activities. Specific and/or unique accomplishments to each FY are as follows:		19.854	12.774	22.322
		-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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<p>FY 2018 Plans: FY 2018 decrease is in-line with efforts to transition focus from top-level systems engineering to element engineering.</p> <ul style="list-style-type: none"> - Identify and address Mid-term discrimination integration issues and work resolution with BMDS Elements in preparation for 2021 Technical Capability Declaration. - Support modifications to Mid-term discrimination content in the integrated master assessment plan and integrated master test plan. - Develop detailed plan to support Mid-term discrimination Technical Capability Declaration. <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Develop and refine requirements to integrate new and improved discrimination capabilities. - Complete integration phase of ground testing for Mid-term discrimination capabilities via GTI-08. - Monitor Mid-term ground testing and analyze test results. - Support planning of distributed phase of ground testing for Mid-term discrimination capabilities via GTD-08. <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects providing system-level engineering for required discrimination capabilities, including electronic protection based on threat requirements and emergent threats, to improve communications and sensor performance for Homeland defense.</p>			
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<p>Title: Risk Management</p> <p align="right">Articles:</p> <p>Description: The Risk Management task identifies BMDS element and component technical risks, and tracks status and risk mitigation progress.</p> <ul style="list-style-type: none"> - Convene and chair Risk Management Working Group. - Execute the risk management and mission readiness working group process. - Maintain a risk database using the Failure Reporting and Corrective Action System. - Review and approve program element risks, on quarterly basis. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p>	7.619	8.145	7.768
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs		Project (Number/Name) MD24 / System Engineering & Integration
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
N/A				
<p>Title: Anti-Tamper & Engineering Manufacturing Readiness Level Development</p> <p align="right">Articles:</p> <p>Description: This task develops anti-tamper approaches to inhibit reverse engineering of critical technologies, and oversees the use of Engineering and Manufacturing Readiness Levels (EMRLs) to assess BMDS element, component, or system maturity.</p> <ul style="list-style-type: none"> - Develop anti-tamper approaches to enable international fielding, support coalition warfare, and extend the effective operational life of the BMDS. - Engage and support the Services in understanding and transitioning BMDS Element Anti-Tamper activities. - Participate in Element reviews to assess proposed Anti-Tamper solutions and assist programs in developing and implementing Anti-Tamper detection and response technologies to mitigate risk. - Monitor application of EMRLs to evaluate engineering and manufacturing maturity of BMDS elements, systems, and components. - Assess and report readiness of MDA development efforts for transition to production. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>		5.353 -	5.795 -	5.637 -
<p>Title: Manufacturing and Producibility</p> <p align="right">Articles:</p> <p>Description: This activity supports a system-level manufacturing and producibility team to address materials, key component, and subsystem design and development to reduce cycle time, part count, and risk. This activity also supports a system-level reliability team to reduce risk of test failures and performance shortcomings and drive reliability into system and component designs.</p> <ul style="list-style-type: none"> - Assess BMDS industrial base and determine critical manufacturing technologies -- Conduct assessments of critical component supply base and update critical technologies database -- Collaborate with national security space components on investment strategies for critical technologies -- Develop engineering management tool to characterize industrial base risks. - Utilize supply chain risk identification and mitigation tracking system to mitigate manufacturing supply issues for critical components 		4.662 -	4.944 -	4.647 -

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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<p>- Assess the effectiveness of reliability programs for each MDA Product (Radar, Launcher, Missile/Interceptor, etc.) to achieve/sustain required reliability.</p> <p>- Perform reliability, composite risk, and probability of mission success assessments for flight tests.</p> <p>- Identify failure trends/modes and evaluate impact on the Probability of Mission Success; evaluate potential corrective actions</p> <p>-- Provide element/program scorecard data to support reliability evaluations/assessments.</p> <p>- With Logistics Support, develop MDA Reliability and Logistic Policies/Plans to promote an integrated Sustainability efforts</p> <p>- Ensure that BMDS products have achieved the required maturity in Reliability, Availability, and Maintainability (RAM) to support the transition from MDA to the appropriate service organization; provide RAM expertise as needed to Element Program Offices.</p> <p>- Provide updates to MDA RAM policy and guidance.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>			
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<p>Title: Aegis Ashore Defense</p> <p align="right">Articles:</p> <p>Description: Consistent with direction in Public Law 114-92, National Defense Authorization Act for FY 2016, the Department is required to provide defense of Aegis Ashore sites in Romania and Poland by mid-year 2019. This effort will build upon a previously-conducted study that assessed potential options to fulfill this requirement.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Demonstrate a viable, organic capability for Aegis Ashore sites in Romania and Poland in accordance with the NDAA. -- Conduct testing, analysis and assessment utilizing the land-based test facility at White Sands Missile Range (WSMR). -- Partner with MDA Functional and Navy/Army Program Offices to conduct two demonstrations at WSMR in FY18. - Develop and implement an architecture, and prove a target track provided by an Army sensor can effectively provide enough track data to allow the Aegis Combat System (ACS) to develop an engagement order. - Integrate Navy's Sea Rolling Airframe Missile (SeaRAM) with the ACS to characterize architecture and functionality. - Conduct a live missile test to prove missile performance over land. <p>FY 2019 Plans:</p>	0.000 -	10.000 -	0.000 -
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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018			
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019	
N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: Effort is scheduled for completion in FY 2018.					
Title: USFK JEON Capability		0.000	16.200	14.500	
		Articles:	-	-	-
Description: In conjunction with the Lower Tier Project Office (LTPO), MDA requested and was approved funding for a four-phased capability enhancement project in response to a U.S. Forces-Korea (USFK) Joint Emergent Operational Need (JEON). Congress approved \$74.1 million in an FY 2017 Rapid Acquisition Authority (RAA), and an FY 2018 Budget Amendment was submitted for \$16.2 million in the Enabling PE to continue this effort to meet this emergent requirement. System-level engineering activities will enable the development, testing and deployment of an integrated solution for upper tier/lower tier integration by achieving enhanced interoperability between the Terminal High Altitude Area Defense (THAAD) and PATRIOT capabilities: -- Develop threat updates to inform requirements -- Develop functional, performance, and interface requirements -- Develop test requirements -- Update Modeling and Simulation (M&S) frameworks and core truth models -- Provide M&S integration for testing, and provide Wargame and training support -- Develop requirements for capability assessments -- Provide test and performance analysis -- Perform Element integration					
FY 2018 Plans: - Improve THAAD and Aegis BMD system performance against emerging threats. - Improve command and control infrastructure and interoperability.					
FY 2019 Plans: - Improve THAAD performance against defended area and emerging threats.					
FY 2018 to FY 2019 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals		150.748	166.558	170.348	

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603881C: <i>Ballistic Missile</i>	197.171	292.262	214.173	-	214.173	199.399	197.451	174.161	152.174	Continuing	Continuing
<i>Defense Terminal Defense Segment</i>											
• 0603882C: <i>Ballistic</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
<i>Missile Defense Midcourse</i>											
<i>Defense Segment</i>											
• 0603884C: <i>Ballistic</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
<i>Missile Defense Sensors</i>											
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603896C: <i>Ballistic Missile</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
<i>Defense Command and</i>											
<i>Control, Battle Management</i>											
<i>& Communication</i>											
• 0603914C: <i>Ballistic</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
<i>Missile Defense Test</i>											

Remarks

D. Acquisition Strategy

In order to optimize the performance of the BMDS, MDA leverages the nation's engineering Centers of Excellence at government agencies and Military Services, FFRDCs, UARCs, and industry. The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution to the BMDS. Products and Services will be acquired by competitive means to the extent that is possible and practical.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-	-	-	-	-	-	-	-	-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Requirements and Design - Reqs & Design - Lethality Spt - FFRDC/UARC	MIPR	Various : CA	1.041	0.364	Nov 2016	1.046	Nov 2017	0.947	Nov 2018	-		0.947	Continuing	Continuing	Continuing
Requirements and Design - Reqs & Design - Lethality Spt - CSS	C/CPAF	TEAMS : NC	1.459	0.758	Nov 2016	0.000		0.592	Nov 2018	-		0.592	Continuing	Continuing	Continuing
Requirements and Design - Reqs & Design - ATMD Requirements	Various	Various : AL, VA	0.000	3.295	Oct 2016	0.000		0.000		-		0.000	0.000	3.295	0.000
Requirements and Design - Reqs & Design - CSS 1	C/CPFF	MiDAESS / TEAMS : AL	34.147	1.886	Nov 2016	3.654	Nov 2017	4.557	Nov 2018	-		4.557	Continuing	Continuing	Continuing
Requirements and Design - Reqs & Design - CSS 3	C/CPFF	MEI : AL	0.881	0.286	Nov 2016	0.509	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Requirements and Design - Reqs & Design - FFRDC/UARC 1	MIPR	ORNL : TN	0.984	0.000		0.391	Nov 2017	0.399	Nov 2018	-		0.399	Continuing	Continuing	Continuing
Requirements and Design - Reqs & Design - FFRDC/UARC 2	MIPR	MITRE : VA	0.555	0.762	Nov 2016	2.074	Nov 2017	1.196	Nov 2018	-		1.196	Continuing	Continuing	Continuing
Requirements and Design - Reqs & Design - HAENS Spt	MIPR	NSWC Crane : IN	0.974	0.469	Nov 2016	0.479	Nov 2017	0.488	Nov 2018	-		0.488	Continuing	Continuing	Continuing

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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Requirements and Design - Reqts & Design - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	0.000	1.300	Nov 2016	0.000		0.000		-		0.000	0.000	1.300	0.000
Requirements and Design - Reqts & Design - Industry	C/CPFF	Boeing : AL	97.346	9.486	Nov 2016	8.077	Nov 2017	7.095	Nov 2018	-		7.095	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - MDA	Allot	MDA : AL, VA	34.770	11.917	Oct 2016	8.800	Oct 2017	8.018	Oct 2018	-		8.018	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - OGA	MIPR	AMRDEC : AL	5.587	1.872	Nov 2016	2.188	Nov 2017	2.231	Nov 2018	-		2.231	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - Post Intercept Assessment	Various	Various : Various	0.000	0.000		6.900	Dec 2017	5.700	Nov 2018	-		5.700	Continuing	Continuing	Continuing
Integrated Air and Missile Defense (IAMD) - IAMD - FFRDC	Various	Various : AL, VA, MD	2.547	3.303	Nov 2016	0.000		0.000		-		0.000	0.000	5.850	0.000
Integrated Air and Missile Defense (IAMD) - IAMD - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	0.000	0.670	Nov 2016	0.000		0.000		-		0.000	0.000	0.670	0.000
Integrated Air and Missile Defense (IAMD) - IAMD - OGA	MIPR	AMRDEC : AL	0.000	4.319	Nov 2016	4.448	Nov 2017	4.627	Nov 2018	-		4.627	Continuing	Continuing	Continuing
Integrated Air and Missile Defense (IAMD) - IAMD - Support	C/CPFF	MiDAESS / TEAMS : AL, VA, CO	3.391	0.499	Nov 2016	1.498	Nov 2017	2.202	Nov 2018	-		2.202	Continuing	Continuing	Continuing
Integrated Air and Missile Defense (IAMD) - IAMD - Various	MIPR	DoD Activities : Various	22.158	10.501	Nov 2016	10.965	Nov 2017	10.167	Nov 2018	-		10.167	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - CSS	C/CPFF	MiDAESS / TEAMS : AL	5.365	1.044	Nov 2016	3.368	Nov 2017	5.723	Nov 2018	-		5.723	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - CSS 2	C/CPFF	MiDAESS / TEAMS : AL, CO	0.000	2.046	Nov 2016	0.000		0.000		-		0.000	0.000	2.046	0.000

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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 1	MIPR	Aerospace : CA	16.791	1.433	Nov 2016	1.700	Nov 2017	1.750	Nov 2018	-		1.750	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 2	MIPR	JHU/APL : MD, VA	9.996	0.962	Nov 2016	1.100	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 3	MIPR	GTRI : AL	0.000	0.000		0.000		1.125	Nov 2018	-		1.125	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 6	MIPR	MIT/LL : MA	18.526	1.372	Nov 2016	1.400	Nov 2017	1.425	Nov 2018	-		1.425	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 7	MIPR	MITRE : VA	16.567	1.599	Nov 2016	1.618	Nov 2017	1.619	Nov 2018	-		1.619	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	0.993	1.200	Nov 2016	0.000		0.000		-		0.000	0.000	2.193	0.000
System-Level Verification and Assessment - Sys V&A - M&S Accreditation	Various	AMRDEC / Various : AL	0.000	0.000		2.000	Nov 2017	10.581	Nov 2018	-		10.581	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - MDA	Allot	MDA : VA, AL	6.649	0.619	Oct 2016	2.389	Oct 2017	2.306	Nov 2018	-		2.306	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - OGA	MIPR	AMRDEC : AL	8.828	1.043	Nov 2016	1.369	Oct 2017	1.332	Nov 2018	-		1.332	Continuing	Continuing	Continuing
System-Level Verification and Assessment - V&A Industry Support	C/CPFF	Boeing : AL	10.104	3.878	Nov 2016	3.518	Nov 2017	2.897	Nov 2018	-		2.897	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 5	MIPR	Draper : VA	0.000	0.000		0.000		0.639	Nov 2018	-		0.639	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 1	MIPR	Aerospace : CA	11.464	1.716	Nov 2016	1.793	Nov 2017	1.828	Nov 2018	-		1.828	Continuing	Continuing	Continuing

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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Knowledge Centers - KC - FFRDC/UARC 2	MIPR	MIT/LL : MA	7.017	0.983	Nov 2016	1.027	Nov 2017	1.048	Nov 2018	-		1.048	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 3	FFRDC	MITRE : VA	7.068	0.998	Nov 2016	1.042	Nov 2017	1.063	Nov 2018	-		1.063	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 4	FFRDC	JHU/APL : VA	6.478	0.657	Nov 2016	0.820	Nov 2017	0.700	Nov 2018	-		0.700	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 7	MIPR	GTRI : GA	3.939	0.347	Nov 2016	0.363	Nov 2017	0.370	Nov 2018	-		0.370	Continuing	Continuing	Continuing
Knowledge Centers - KC - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	1.332	1.700	Nov 2016	0.000		0.000		-		0.000	0.000	3.032	0.000
Knowledge Centers - KC - MDA	Various	MDA : AL, VA	24.051	6.125	Nov 2016	5.099	Oct 2017	4.460	Oct 2018	-		4.460	Continuing	Continuing	Continuing
Knowledge Centers - KC - TEAMS	C/CPFF	MiDAESS / TEAMS : AL	0.000	0.000		3.276	Nov 2017	2.725	Nov 2018	-		2.725	Continuing	Continuing	Continuing
Knowledge Centers - KC - Various	MIPR	Various : Various	4.023	1.616	Nov 2016	2.049	Nov 2017	1.986	Dec 2018	-		1.986	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - Architecture CSS	C/CPFF	MiDAESS / TEAMS : AL	6.615	3.371	Nov 2016	3.740	Nov 2017	2.920	Nov 2018	-		2.920	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - Architecture Support	Various	Various : VA, AL	6.407	1.109	Nov 2016	1.780	Oct 2017	0.471	Nov 2018	-		0.471	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - CSS	C/CPFF	MiDAESS / TEAMS : AL	21.534	1.498	Nov 2016	0.000		0.000		-		0.000	0.000	23.032	0.000
Future Concepts and Planning - Future Concepts - FFRDC / UARC 1	MIPR	SNL : CA	2.682	0.385	Nov 2016	0.391	Nov 2017	0.399	Nov 2018	-		0.399	Continuing	Continuing	Continuing
Future Concepts and Planning - Future	MIPR	MIT/LL : MA	3.531	0.385	Nov 2016	0.783	Nov 2017	0.797	Nov 2018	-		0.797	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Concepts - FFRDC / UARC 3															
Future Concepts and Planning - Future Concepts - FFRDC / UARC 4	MIPR	JHU/APL : MD, VA	4.453	0.790	Nov 2016	0.000		0.000		-		0.000	0.000	5.243	0.000
Future Concepts and Planning - Future Concepts - FFRDC / UARC 5	MIPR	MITRE : VA	1.982	0.462	Nov 2016	0.478	Nov 2017	0.080	Nov 2018	-		0.080	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - FFRDC / UARC 6	MIPR	Aerospace : CA	2.338	1.727	Nov 2016	0.391	Nov 2017	0.399	Nov 2018	-		0.399	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	0.000	0.450	Nov 2016	0.000		0.000		-		0.000	0.000	0.450	0.000
Future Concepts and Planning - Future Concepts - Industry	C/CPFF	Boeing : AL	28.556	2.420	Nov 2016	2.000	Nov 2017	2.000	Nov 2018	-		2.000	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - Support	Allot	MDA : VA / AL	7.472	2.573	Oct 2016	3.557	Oct 2017	5.922	Oct 2018	-		5.922	Continuing	Continuing	Continuing
Future Concepts and Planning - Hypersonic Defense - CSS	C/CPFF	MiDAESS / TEAMS : AL, VA	0.000	0.800	Apr 2017	0.000		0.000		-		0.000	0.000	0.800	0.000
Future Concepts and Planning - Hypersonic Defense - FFRDC	Various	Various : AL, NM, MA, VA	0.000	2.017	Apr 2017	0.000		0.000		-		0.000	0.000	2.017	0.000
Future Concepts and Planning - Hypersonic Defense - Industry	C/CPAF	Boeing : AL	0.000	1.000	Apr 2017	0.000		0.000		-		0.000	0.000	1.000	0.000
Future Concepts and Planning - Hypersonic Defense - UARC	MIPR	JHU / APL : MD, VA	0.000	1.413	Apr 2017	0.000		0.000		-		0.000	0.000	1.413	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Future Concepts and Planning - Hypersonic Defense - Various	Various	Various : Various	0.000	1.970	Apr 2017	0.000		0.000		-		0.000	0.000	1.970	0.000
Systems Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	1.025	0.270	Nov 2016	0.000		0.000		-		0.000	0.000	1.295	0.000
Systems Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - CSS	C/CPFF	MiDAESS / TEAMS : AL	31.360	4.682	Nov 2016	2.421	Nov 2017	2.063	Nov 2018	-		2.063	Continuing	Continuing	Continuing
Systems Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - CSS 2	C/CPFF	SAIC : VA, AL	13.787	4.556	Nov 2016	7.650	Nov 2017	7.636	Nov 2018	-		7.636	Continuing	Continuing	Continuing
Systems Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - Industry Spt	C/CPFF	Boeing : VA, AL	0.000	0.000		0.000		0.520	Nov 2018	-		0.520	Continuing	Continuing	Continuing
Systems Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - MDA	Various	MDA : VA, AL	2.912	0.357	Nov 2016	0.549	Oct 2017	0.471	Oct 2018	-		0.471	Continuing	Continuing	Continuing
Discrimination - Discrimination - CSS	C/CPFF	MiDAESS / TEAMS : AL	12.738	1.998	Nov 2016	2.489	Nov 2017	2.450	Nov 2018	-		2.450	Continuing	Continuing	Continuing
Discrimination - Discrimination - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	0.000	2.006	Nov 2016	0.000		0.000		-		0.000	0.000	2.006	0.000
Discrimination - Discrimination - Industry	C/CPAF	Boeing : AL, VA	19.572	3.100	Nov 2016	3.172	Nov 2017	12.769	Nov 2018	-		12.769	Continuing	Continuing	Continuing
Discrimination - Discrimination - Support	Allot	MDA : AL, VA	17.015	8.400	Oct 2016	3.337	Oct 2017	3.260	Oct 2018	-		3.260	Continuing	Continuing	Continuing
Discrimination - Discrimination - Various	Various	Various : AL, VA	9.851	4.350	Nov 2016	3.776	Nov 2017	3.843	Nov 2018	-		3.843	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Discrimination - Prior year Discrimination Improvements no longer funded in FYDP	Various	Various : Various	25.213	0.000		0.000		0.000		-		0.000	0.000	25.213	0.000
Risk Management - Risk Mgt - Analysis	Various	MDA : VA, AL	12.731	5.892	Oct 2016	6.824	Oct 2017	6.403	Oct 2018	-		6.403	Continuing	Continuing	Continuing
Risk Management - Risk Mgt - Analysis Spt	C/CPAF	MiDAESS / TEAMS : AL	2.713	0.250	Nov 2016	0.733	Nov 2017	0.767	Nov 2018	-		0.767	Continuing	Continuing	Continuing
Risk Management - Risk Mgt - FFRDC/UARC	MIPR	MITRE : VA	4.247	0.577	Nov 2016	0.588	Nov 2017	0.598	Nov 2018	-		0.598	Continuing	Continuing	Continuing
Risk Management - Risk Mgt - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	1.225	0.900	Nov 2016	0.000		0.000		-		0.000	0.000	2.125	2.125
Anti-Tamper & Engineering Manufacturing Readiness Level Development - AT & EMRL - Anti-Tamper Support	MIPR	NSWC Crane : IN	6.268	0.213	Nov 2016	0.498	Nov 2017	0.508	Nov 2018	-		0.508	Continuing	Continuing	Continuing
Anti-Tamper & Engineering Manufacturing Readiness Level Development - AT & EMRL - MDA	Allot	MDA : AL, VA	15.998	4.927	Oct 2016	5.297	Oct 2017	5.129	Oct 2018	-		5.129	Continuing	Continuing	Continuing
Anti-Tamper & Engineering Manufacturing Readiness Level Development - OGA Support	MIPR	AMRDEC : AL	0.769	0.213	Nov 2016	0.000		0.000		-		0.000	0.000	0.982	0.000
Anti-Tamper & Engineering Manufacturing Readiness Level Development - Prior year AT & EMRL no longer funded in FYDP	Various	Various : Various	2.001	0.000		0.000		0.000		-		0.000	0.000	2.001	0.000
Manufacturing and Producibility - Core Standards	C/CPFF	Boeing : AL	2.200	1.113	Nov 2016	1.500	Nov 2017	1.282	Nov 2018	-		1.282	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Manufacturing and Producibility - Mfg and Producibility	Allot	MDA : AL	1.932	0.491	Oct 2016	1.475	Oct 2017	2.154	Oct 2018	-		2.154	Continuing	Continuing	Continuing
Manufacturing and Producibility - Mfg and Producibility - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	0.500	0.950	Nov 2016	0.000		0.000		-		0.000	0.000	1.450	0.000
Manufacturing and Producibility - Mfg and Producibility - OGA Support	MIPR	AMRDEC : AL	5.913	2.108	Nov 2016	1.969	Nov 2017	1.211	Nov 2018	-		1.211	Continuing	Continuing	Continuing
Aegis Ashore Defense - Concept Dev	Various	Various : Various	0.000	0.000		10.000	Nov 2017	0.000		-		0.000	0.000	10.000	0.000
USFK JEON Capability - CSS	C/CPFF	TEAMS : VA, AL	0.000	0.000		0.652	Dec 2017	0.562	Nov 2018	-		0.562	Continuing	Continuing	Continuing
USFK JEON Capability - FFRDC/UARC	MIPR	MITRE : VA	0.000	0.000		0.528	Jan 2018	0.499	Nov 2018	-		0.499	Continuing	Continuing	Continuing
USFK JEON Capability - Framework, Truth Models	Various	Various : CO, AL	0.000	0.000		1.064	Jan 2018	1.628	Nov 2018	-		1.628	Continuing	Continuing	Continuing
USFK JEON Capability - Industry Support	C/CPFF	Boeing : AL, VA	0.000	0.000		2.106	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
USFK JEON Capability - Industry Support - IRES	C/CPAF	Northrop Grumman : AL, VA	0.000	0.000		2.445	Dec 2017	2.494	Nov 2018	-		2.494	Continuing	Continuing	Continuing
USFK JEON Capability - OGA	MIPR	AMRDEC : AL	0.000	0.000		0.984	Dec 2017	1.016	Nov 2018	-		1.016	Continuing	Continuing	Continuing
USFK JEON Capability - Systems Engineering	Various	MDA Various : VA, AL, CO	0.000	0.000		1.179	Dec 2017	2.996	Nov 2018	-		2.996	Continuing	Continuing	Continuing
USFK JEON Capability - Test & Performance Analysis	Various	Various : VA, AL	0.000	0.000		3.268	Jan 2018	3.967	Nov 2018	-		3.967	Continuing	Continuing	Continuing
USFK JEON Capability - UARC	MIPR	JHU / APL : MD, VA	0.000	0.000		3.974	Dec 2017	1.338	Nov 2018	-		1.338	Continuing	Continuing	Continuing
Subtotal			640.571	150.748		166.558		170.348		-		170.348	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	640.571	150.748	166.558	170.348	-	170.348	Continuing	Continuing	N/A

Remarks
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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	Element Test Complete			System Level Test Complete			Complete Activity			
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2017	FY 2018	FY 2019
Update to BMD SDD - FY 2018		△								
Update to IMAP - 1Q FY 2018		△								
Element Design Reviews - FY 2018		△								
BMD SS - FY 2018		△								
BMD SER - FY 2018			△							
Update Achievable Capabilities List - FY 2018			△							
Update to IMAP - 3Q FY 2018			△							
Element/Component Characterization for Analysis (E/CCA) - 4Q - FY 2018				△						
Technical Objectives & Goals / Effectiveness Metrics Standard Updates - FY 2018				△						
Update MIP - FY 2018				△						
Update to BMD SDD - FY 2019					△					
Deliver Assessment for EPAA Phase 3 – FY 2019					△					
BMD SS - FY 2019						△				
Element Design Reviews - FY 2019						△				
SEP Update - FY 2019						△				
Update to IMAP - 3Q FY 2019							△			
BMDS Engineering Review - FY 2019							△			
Update MIP - FY 2019								△		
E/CCA 4Q - FY 2019									△	
Update to BMD SDD - FY 2020										△
Update Achievable Capabilities List - FY 2020										△
SEP Update - FY 2020										△
BMD SS - FY 2020										△
BMDS Engineering Review - FY 2020										△

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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	Significant Event Complete ▲		Milestone Decision Complete ★		Element Test Complete ◆		System Level Test Complete ●		Complete Activity ◆	
	Significant Event Planned △		Milestone Decision Planned ☆		Element Test Planned ◇		System Level Test Planned ○		Planned Activity ◇	
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023			
Update to IMAP - 3Q FY 2020				△						
Update MIP - FY 2020				△						
E/CCA - 4Q - FY 2020				△						
Update to BMD SDD - FY 2021					△					
SEP Update FY 2021						△				
BMD SS - FY 2021						△				
BMDS Engineering Review - FY 2021							△			
Update to IMAP - 3Q FY 2021								△		
Update Achievable Capabilities List - FY 2022									△	
Update MIP - FY 2021									△	
E/CCA - 4Q FY 2021									△	
Update to BMD SDD - FY 2022										△
SEP Update FY 2022										△
BMD SS - FY 2022										△
Updates to IMAP -3Q FY 2022										△
BMDS Engineering Review - FY 2022										△
Update MIP - FY2022										△
E/CCA - 4Q FY 2022										△
Update to BMD SDD - FY 2023										△
BMD SS - FY 2023										△
Update to IMAP - 3Q FY 2023										△
E/CCA - 4Q - FY 2023										△
Update MIP - FY 2023										△

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Update to BMD SDD - FY 2018	1	2018	1	2018
Update to IMAP - 1Q FY 2018	1	2018	1	2018
Element Design Reviews - FY 2018	2	2018	2	2018
BMD SS - FY 2018	2	2018	2	2018
BMD SER - FY 2018	3	2018	3	2018
Update Achievable Capabilities List - FY 2018	3	2018	3	2018
Update to IMAP - 3Q FY 2018	3	2018	3	2018
Element/Component Characterization for Analysis (E/CCA) - 4Q - FY 2018	4	2018	4	2018
Technical Objectives & Goals / Effectiveness Metrics Standard Updates - FY 2018	4	2018	4	2018
Update MIP - FY 2018	4	2018	4	2018
Update to BMD SDD - FY 2019	1	2019	1	2019
Deliver Assessment for EPAA Phase 3 FY 2019	1	2019	1	2019
BMD SS - FY 2019	2	2019	2	2019
Element Design Reviews - FY 2019	2	2019	2	2019
SEP Update - FY 2019	2	2019	2	2019
Update to IMAP - 3Q FY 2019	3	2019	3	2019
BMDS Engineering Review - FY 2019	3	2019	3	2019
Update MIP - FY 2019	4	2019	4	2019
E/CCA 4Q - FY 2019	4	2019	4	2019
Update to BMD SDD - FY 2020	1	2020	1	2020
Update Achievable Capabilities List - FY 2020	1	2020	1	2020
SEP Update - FY 2020	2	2020	2	2020
BMD SS - FY 2020	2	2020	2	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD24 / System Engineering & Integration
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Events	Start		End	
	Quarter	Year	Quarter	Year
BMDS Engineering Review - FY 2020	3	2020	3	2020
Update to IMAP - 3Q FY 2020	3	2020	3	2020
Update MIP - FY 2020	4	2020	4	2020
E/CCA - 4Q - FY 2020	4	2020	4	2020
Update to BMD SDD - FY 2021	1	2021	1	2021
SEP Update FY 2021	2	2021	2	2021
BMD SS - FY 2021	2	2021	2	2021
BMDS Engineering Review - FY 2021	3	2021	3	2021
Update to IMAP - 3Q FY 2021	3	2021	3	2021
Update Achievable Capabilities List - FY 2022	3	2021	3	2021
Update MIP - FY 2021	4	2021	4	2021
E/CCA - 4Q FY 2021	4	2021	4	2021
Update to BMD SDD - FY 2022	1	2022	1	2022
SEP Update FY 2022	2	2022	2	2022
BMD SS - FY 2022	2	2022	2	2022
Updates to IMAP -3Q FY 2022	3	2022	3	2022
BMDS Engineering Review - FY 2022	3	2022	3	2022
Update MIP - FY2022	4	2022	4	2022
E/CCA - 4Q FY 2022	4	2022	4	2022
Update to BMD SDD - FY 2023	1	2023	1	2023
BMD SS - FY 2023	2	2023	2	2023
Update to IMAP - 3Q FY 2023	3	2023	3	2023
E/CCA - 4Q - FY 2023	4	2023	4	2023
Update MIP - FY 2023	4	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs				Project (Number/Name) MT23 / Enabling - Test			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT23: <i>Enabling - Test</i>	34.268	17.187	22.767	39.288	-	39.288	20.666	21.328	21.081	21.373	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2018 to FY 2019 reflects additional requirements for the Continuous Integration and Agile Test (CI/CAT) capability for HWIL / Ground Test, incorporation of cyber security test engineering, and Non-MDA Element (NME) test engineering support for System Post Flight Reconstructions (SPFRs) previously funded in Program Element 0603914C.

A. Mission Description and Budget Item Justification

The Enabling Test project includes the SE&I that drives BMDS test planning, execution, and post-test analysis and assessment, and the M&S tools and framework required to prepare for and execute ground and flight tests.

SE&I allocates test requirements to individual test events, designs test architectures, defines target requirements, and generates ground and flight test scenarios to collect data essential for model validation and system verification. SE&I works with the Service Operational Test Agencies (OTA) to incorporate operational test requirements into BMDS events to ensure the incremental capability being transferred to the Warfighter will be operationally effective, suitable, and survivable. The resulting data ensures BMDS requirements are being met by the system under test and confirms proper BMD System operation. It also helps to anchor system and element M&S for use in simulations to characterize BMDS performance across the battle space, including areas where no live-fire-testing is performed.

Engineering ground test (GT) responsibilities include BMDS performance sensitivity analysis; scenario design and optimization; analysis to mitigate test data collection risks; test architecture certification analysis; and test result analysis. Flight test (FT) responsibilities include pre-mission scenario analysis to identify and mitigate test execution risk in advance; range safety analysis; mission analysis during test execution; extensive post-mission analysis; and event analysis reporting products. These efforts inform senior leaders' decisions on BMDS development and evolution and underpin the BMDS capability declarations that deliver new capabilities to the Warfighter.

Pre-mission predictions use the test framework and Hardware in the Loop (HWIL) and digital models of the test configuration to exercise system interfaces, calculate expected BMDS performance, and gauge readiness for test execution. Post-mission, MDA uses test results to anchor System and element M&S and provide confidence in their ability to correctly predict BMDS behavior and performance.

Reliability, Availability and Maintainability data collected through BMDS test events increases confidence in BMDS performance over the entire lifecycle. SE&I documents any abnormal system behavior observed during tests and alerts MDA to issues with test article reliability. SE&I leads test failure review boards, identifies data collection shortfalls, and reallocates objectives to future test events as needed until all required model validation data is collected. The Failure Reporting, Analysis, and Corrective Action System provides a framework to investigate test failures and anomalies and identify solutions that will ultimately improve BMDS performance and reliability.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MT23 / Enabling - Test
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MDA's M&S systems and products provide the BMDS, the Warfighter, and the OTA with the capability to evaluate individual BMDS components and the overall M&S system-of-systems. MDA validates and accredits system-level models and simulations to support accurate and comprehensive assessments of the BMDS. M&S System and product testing follows the test program outlined in MDA's IMTP and serves as a necessary precursor to conducting BMD System-level testing. Resources for the planning, design, execution and management of this testing are provided in accordance with the BMDS Test Policy, as listed in the most current version of the IMTP.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>Title: Engineering and Analysis</p> <p align="right">Articles:</p> <p>Description: The Engineering and Analysis effort provides essential BMDS ground and flight test event planning, execution, and evaluation activities for each test event:</p> <ul style="list-style-type: none"> - Designing test architecture, defining test objectives and evaluation criteria, defining target requirements, and generating ground and flight test scenarios appropriate to the data collection requirements to assess BMDS performance and anchor Models and Simulations. - Producing the threat data for BMDS ground and flight tests. - Coordinating with BMDS Operational Test Agency (OTA) to address test issues, disposition them, coordinate them, with the OTA and recommend action plans to achieve closure. - Delivering HWIL M&S integration test cases. - Conducting M&S HWIL Integration Benchmark and integrating the BMDS HWIL M&S framework with MDA and non-MDA Elements into the test event BMDS architecture. - Integrating, testing, functionally qualifying, and delivering end-to-end BMDS simulations supporting ground test missions. - Deploying and maintaining M&S System Interface Units (SIUs) for BMDS testing. - Analyzing System-level interoperability. - Conducting modeling and technical analysis for Combatant Command wargames and exercises. - Utilizing M&S for pre-test assessment and post-test review, as well as M&S updates. - Providing test configuration management; risk assessments; and anomaly/deficiency review, assessment and closure. - Analyzing test results to identify verification and validation data collection shortfalls and reassigning objectives to future test events as required. - Documenting BMDS test observations for system-level test anomalies and coordinating the resulting BMDS Discrepancy Reports within the Failure Reporting, Analysis, and Corrective Action System (FRACAS) - Upgrading test analysis tools in concert with the BMDS evolution (e.g., Modular Analysis and Reporting Suite (MARS)) to enhance analysis capability and efficiency. <p>Specific unique accomplishments per FY are as follows:</p> <p>FY 2018 Plans:</p>	17.187	22.767	34.131
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MT23 / Enabling - Test		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>FY 2018 increase keeps pace with projected FY 2018-FY 2022 IMTP events, and reflects System-level test analyses, M&S integration, and supporting validation and assessment activities required for EPAA Phase 3 Technical Capability Declaration (TCD).</p> <p>- Validate test event data collection and conduct post-test analyses supporting the EPAA Phase 3 TCD.</p> <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Provide more robust BMDS architecture analysis for Ground Test to support expanded assessment requirements. - Increase Cybersecurity requirements across Ground Test venues and cybersecurity events. - Purchase additional System Interface Units (SIUs) for new BMDS hardware under test (i.e., LRDR, Clear UEWR) - Augment test and performance analysis capability in response to: <ul style="list-style-type: none"> -- Increased number of flight and ground test events requiring system analysis -- Extended analysis timeline due to early analysis requirements - Develop/refine requirements for Continuous Integration and Agile Test (CI/CAT) capability - Begin implementation of M&S infrastructure upgrades to support CI/CAT <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects incorporation of cyber security test engineering, and Non-MDA Element (NME) test engineering support for SPFRs previously funded in Program Element 0603914C.</p>				
<p>Title: Continuous Integration and Agile Test (CI/CAT)</p> <p align="right">Articles:</p>		0.000	0.000	5.157
<p>Description: MDA Engineering will provide test planning, analysis, M&S integration, M&S execution, and post-event analysis to support the BMDS-wide Continuous Integration / Continuous Agile Testing approach for integrated ground testing. Specific unique accomplishments per FY are as follows:</p> <p>FY 2018 Plans: N/A</p> <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Develop/refine requirements for Continuous Integration and Agile Test (CI/CAT) capability - Begin implementation of M&S infrastructure upgrades to support CI/CAT <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects additional requirements for the Continuous Integration and Agile Test (CI/CAT) capability for HWIL / Ground Test.</p>		-	-	-
Accomplishments/Planned Programs Subtotals		17.187	22.767	39.288

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MT23 / Enabling - Test
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0604878C: <i>Aegis BMD Test</i>	131.012	137.783	95.756	-	95.756	80.684	94.138	146.910	137.601	Continuing	Continuing

Remarks

D. Acquisition Strategy

In order to optimize the performance of the BMDS, MDA leverages the nation's engineering Centers of Excellence at government agencies and Military Services, FFRDCs, UARCs, and industry. The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution to the BMDS. MDA will acquire products and services by competitive means to the extent practical.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MT23 / Enabling - Test
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering and Analysis - Engineering & Analysis - CSS Support	C/CPFF	MiDAESS / TEAMS : AL	1.494	1.514	Oct 2016	1.526	Nov 2017	2.147	Nov 2018	-		2.147	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - FFRDC	MIPR	Aerospace : AL	0.346	0.385	Nov 2016	0.391	Nov 2017	0.399	Nov 2018	-		0.399	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - Industry	C/CPAF	Boeing : VA, AL	7.705	2.382	Nov 2016	4.486	Nov 2017	5.405	Nov 2018	-		5.405	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - Integration Support CSS	C/CPAF	COLSA : AL, CO	7.866	5.328	Nov 2016	7.505	Nov 2017	8.774	Nov 2018	-		8.774	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - OGA Support	MIPR	AMRDEC : AL	12.739	7.301	Nov 2016	7.032	Nov 2017	10.441	Nov 2018	-		10.441	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - OGA Support - NME	MIPR	LTPO : AL	0.000	0.000		1.652	Nov 2017	4.375	Nov 2018	-		4.375	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - Technical Support	C/CPAF	Northrop Grumman : VA, AL	2.559	0.000		0.000		2.340	Nov 2018	-		2.340	0.000	4.899	0.000
Engineering and Analysis - Engineering & Analysis - Test Engineering Support	Various	Various : AL, CO, VA	1.559	0.277	Nov 2016	0.175	Nov 2017	0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MT23 / Enabling - Test
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Continuous Integration and Agile Test (CI/CAT) - CSS	Various	Various : Various	0.000	0.000		0.000		2.734	Nov 2018	-		2.734	Continuing	Continuing	Continuing
Continuous Integration and Agile Test (CI/CAT) - Hardware	C/CPFF	TBE : AL	0.000	0.000		0.000		2.423	Nov 2018	-		2.423	Continuing	Continuing	Continuing
Subtotal			34.268	17.187		22.767		39.288		-		39.288	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		34.268	17.187	22.767	39.288	-	39.288	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MT23 / Enabling - Test
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
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Remarks N/A									
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MT23 / Enabling - Test
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	Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆											
	Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇											
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
IMTP v19.1 flight and ground test event details are at a higher classification.	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Integrated Master Test Plan (IMTP) Engineering Inputs - 1Q - FY 2018							△																					
IMTP Engineering Inputs - 3Q - FY 2018								△																				
IMTP Engineering Inputs - 1Q - FY 2019											△																	
IMTP Engineering Inputs - 3Q - FY 2019												△																
IMTP Engineering Inputs - 1Q - FY 2020															△													
IMTP Engineering Inputs - 3Q - FY 2020																△												
IMTP Engineering Inputs - 1Q - FY 2021																			△									
IMTP Engineering Inputs - 2Q - FY 2021																				△								
IMTP Engineering Inputs - 1Q - FY2022																							△					
IMTP Engineering Inputs - 3Q - FY 2022																								△				
IMTP Engineering Inputs - 1Q - FY 2023																										△		
IMTP Engineering Inputs - 3Q - FY 2023																											△	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MT23 / Enabling - Test
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023
Integrated Master Test Plan (IMTP) Engineering Inputs - 1Q - FY 2018	1	2018	1	2018
IMTP Engineering Inputs - 3Q - FY 2018	3	2018	3	2018
IMTP Engineering Inputs - 1Q - FY 2019	1	2019	1	2019
IMTP Engineering Inputs - 3Q - FY 2019	3	2019	3	2019
IMTP Engineering Inputs - 1Q - FY 2020	1	2020	1	2020
IMTP Engineering Inputs - 3Q - FY 2020	3	2020	3	2020
IMTP Engineering Inputs - 1Q - FY 2021	1	2021	1	2021
IMTP Engineering Inputs - 2Q - FY 2021	3	2021	3	2021
IMTP Engineering Inputs - 1Q - FY2022	1	2022	1	2022
IMTP Engineering Inputs - 3Q - FY 2022	3	2022	3	2022
IMTP Engineering Inputs - 1Q - FY 2023	1	2023	1	2023
IMTP Engineering Inputs - 3Q - FY 2023	3	2023	3	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs				Project (Number/Name) MD28 / Intelligence & Security			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD28: <i>Intelligence & Security</i>	147.039	44.696	44.708	44.078	-	44.078	47.226	46.859	47.581	48.905	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2018, funding for Cyber related portion of Insider Threat mitigation has been transferred to project MC31, Engineering - Cyber.

A. Mission Description and Budget Item Justification

The Intelligence and Security program provides multi-disciplinary intelligence and security for the BMDS acquisition, development, test and deployment. The Intelligence and Security Major Program Goals are:

- Ensure the Intelligence Community (IC) understands and fulfills MDA's current and future prioritized intelligence requirements; advocate BMDS test intelligence requirements; and work closely with the IC.
- Leverage available National and DoD Counterintelligence resources. Ensure counterintelligence products and services are fully integrated into all RDT&E programs and activities to protect classified information and critical technologies and to protect MDA and BMDS personnel, facilities, information and activities.
- Define cybersecurity systems engineering requirements for BMDS assets. Identify cybersecurity systems engineering and infrastructure intelligence requirements to focus IC collection, analysis and production to target MDA/BMDS cyber vulnerabilities. Incorporate cybersecurity engineering requirements into the BMDS systems engineering process.
- Provide cross-Agency acquisition security oversight and support for the identification and protection of Critical Program Information (CPI), and evaluation and implementation of developing Supply Chain Risk Management (SCRM) requirements. Provide physical security for BMDS weapons/sensor system deployments, including Foreign Military Sales (FMS). Implement MDA's information security and declassification programs. Strengthen Test and Operations Security (OPSEC) across the Agency.

The Security and Intelligence Project captures five specific areas: 1) Intelligence; 2) Counterintelligence; 3) Cybersecurity Engineering; 4) Program Protection (formerly Research, Development, and Acquisition (RDA) Security); and 5) Threat Systems Engineering. Collectively, these efforts provide critical information regarding threat ballistic missile system capabilities; protection of personnel, activities, and technology from espionage and terrorism; and identification and mitigation of BMDS system vulnerabilities.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Intelligence	9.203	10.324	10.186
Articles:	-	-	-
Description: The Intelligence program provides expertise to develop intelligence products on threat ballistic missile system capabilities, and leverages unique intelligence-community developed, owned, and operated capabilities for the benefit and advocacy of the missile defense community. Program goals include:			
- Serve as designated intelligence broker between MDA and the Intelligence Community			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018			
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019	
<p>-- Maintain and communicate prioritized, specific BMDS intelligence requirements to the Intelligence Community.</p> <p>-- Maintain a focused dialog with members of the Intelligence Community to ensure understanding, urgency and context of MDA intelligence requirements.</p> <p>- Provide Current, Technical, Acquisition, Collection and Cyber intelligence to the BMDS throughout the acquisition life cycle.</p> <p>- Maintain and update MDA's knowledge base of foreign ballistic missile threats, including development, enhancement, and population of the Missile Threat Portals with Intelligence Community produced documents at the appropriate security classification levels.</p> <p>- Characterize all ballistic missile threat systems from adversaries for use by the MDA Systems Engineer, Program Managers, and Director for Test to perform modeling, simulation, and testing of the BMDS.</p> <p>- Maintain Missile Intelligence Secure Link (MISL) classified portal (full operational capability).</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: FY 2018 increase reflects need for additional, dedicated support to new BMDS programs (e.g., LRDR). - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>					
Title: Counterintelligence		6.389	6.919	6.776	
		Articles:	-	-	-
<p>Description: The Counterintelligence Program detects, exploits or neutralizes espionage, foreign intelligence collection activities and terrorist activities conducted for or on behalf of foreign powers, organizations, persons, or their agents directed against U.S. national security interests, or DoD/MDA and its personnel, information, material, facilities, and activities. Program goals include:</p> <p>- Serve as MDA Liaison with Federal, State and Local Law Enforcement and Counterintelligence (CI) Organizations to report and resolve incidents involving MDA personnel, information and technologies.</p> <p>-- Engage National, Combatant Command and DoD CI resources to share and obtain threat information impacting MDA personnel, facilities, information, technologies, programs and activities, worldwide.</p> <p>-- Provide CI, technical and cyber threat support to MDA flight tests, conferences, and BMDS deployment activities worldwide, including FMS Programs, to detect, deter, or neutralize criminal, terrorist and foreign intelligence collection threats targeting MDA and BMDS technologies, personnel, facilities and activities.</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018		FY 2019
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<p>- Execute life cycle replacement of outdated technical surveillance countermeasures and cyber forensics gear to employ the latest technologies during conferences, flight tests and other classified activities to detect, deter and prevent the loss or compromise of classified or sensitive information to foreign adversary collection activities.</p> <p>- Conduct CI in Cyberspace activities to detect malicious and insider threat activities targeting MDA administrative and fire control networks.</p> <p>- Conduct MDA Insider Threat Program to identify, deter and mitigate potential insider threats.</p> <p>- Provide required CI Awareness and Reporting training to MDA workforce.</p> <p>- Provide CI research and assistance for cyber forensics and analysis to identify insider and foreign entity cyber threats to MDA computer networks and BMDS fire control systems.</p> <p>- Conduct CI research and analysis to produce CI threat products that address foreign intelligence, cyber and international terrorist threats to MDA personnel, facilities, information, systems and activities worldwide.</p> <p>- Maintain technical surveillance countermeasures and cyber forensic gear to detect, identify and neutralize adversary collection platforms and capabilities used to gain unauthorized access to MDA classified and controlled unclassified information.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: FY 2018 increase reflects need for additional Cyber Assessment Team assets. - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
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Title: Cybersecurity Engineering Program	4.958	4.537		4.572
Articles:	-	-		-

Description: The Cybersecurity Engineering Program is focused on developing designs and solutions to protect the BMDS from existing and emerging cyber threats through coherent cybersecurity systems engineering. Program goals include:

- Ensure Cybersecurity is integrated into the Acquisition Process.
- Assess the Cybersecurity Architecture to address gaps/disconnects, enhance interoperability, and realize efficiencies across all mission systems. Define the "As Built" and "To Be" Cybersecurity Systems Engineering concepts to strengthen technical assessments and cybersecurity design solutions and implementation recommendations impacted by the change in requirements.
- Develop and coordinate near-term and long-term engineering changes to the BMDS
- Develop requirements for building cybersecurity into incremental BMDS Hardware and Software builds
- Monitor allocation of these requirements to the Elements.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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-- Recommend updates to the BMDS Core Standards, including Cyber-related requirements specified by the Agency, the Combatant Commanders (CCMDs), the DoD, and the Federal Government.

-- Perform cybersecurity systems engineering assessments for proposed BMD System Specification and interface changes and additions.

- Provide and recommend updates to cybersecurity systems engineering policy and guidance for BMDS system design and acquisition to enhance BMDS resiliency against cyber threats
- Implement cybersecurity engineering resiliency techniques.
- Provide objectives and requirements for Cybersecurity testing.
- Provide independent cybersecurity reviews at critical engineering milestones.
- Provide information system security engineering by assessing cybersecurity requirements, design, and implementations and provide recommendations to address architecture gaps or shortfalls.
- Implement cyber threat mitigation strategies within BMDS architecture, design, system requirements, and specifications documentation to ensure traceability to necessary components and interfaces that make up the BMDS mission.
- Coordinate evaluation of cybersecurity capability during BMDS tests.
- Develop verification and assessment strategies for system cybersecurity requirements.

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:

Beginning in FY 2018, funding for Cyber related portion of Insider Threat mitigation has been transferred to project MC31, Engineering - Cyber.

- SEE ABOVE.

FY 2019 Plans:

- SEE ABOVE.

FY 2018 to FY 2019 Increase/Decrease Statement:

N/A

Title: Program Protection	10.965	11.998	11.889
Articles:	-	-	-
Description: Program Protection (formerly RDA Security) protects BMDS information, Critical Program Information, technologies, and deploying systems; develops and coordinates Security Classification Guides; and performs declassification reviews to identify equities that warrant continued protection in order to preserve the technological advantage of the BMDS. Program Protection also coordinates MDA intelligence, counterintelligence and security to help BMDS test activities. Program goals include:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018		FY 2019
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<ul style="list-style-type: none"> - Perform reviews required for all Agency public release, security classification, and FOIA and Mandatory Declassification Reviews to ensure sensitive BMDS information is not inadvertently released into the public domain. - Perform Information Security program management and oversee implementation by MDA programs -- Perform internal program reviews, policy oversight and implementation, and training to identify and fix deficiencies and protect critical BMDS information -- Collect information required for annual reports and communicate security posture to leadership - Provide security oversight for the Agency's classified contracts by drafting and coordinating DD254 "Contract Security Classification Specification" documents. - Execute an effective SCRM program to prevent unmitigated risks from degrading the performance of components and systems across the BMDS supply chain. - Provide dedicated on-site security and protection of BMDS resources and personnel at operational sites in Alaska, California and Colorado to ensure security protection coverage of the BMDS mission operations and test assets based in those regions. - Perform systematic Declassification reviews on historical Agency information to prevent unauthorized disclosures due to automatic declassification requirements. - Identify and integrate Physical Security requirements for overseas sites with existing or planned missile defense weapons or sensor systems to ensure protection of deployed sites. - Provide effective physical protection to low density/high demand emerging warfighter capability. - Expand security activities to include FMS. - Conduct program protection planning for the continuing assessment of candidate critical program information for Advanced Technology programs and reassessment of other BMDS programs affected by technical baseline changes; ensure critical technologies embedded in missile defense systems are not vulnerable to compromise. - Keep pace with mission growth in program protection, system security engineering, acquisition security, and SCRM. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
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Title: Threat Systems Engineering				
Articles:	13.181	10.930		10.655
	-	-		-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Description: Threat Engineering provides representations of adversary missile capabilities based on available intelligence information, and develops, coordinates, and baselines BMDS-level targets and countermeasures requirements to define target capabilities required to meet BMDS flight test objectives. Program goals include:</p> <ul style="list-style-type: none"> - Develop threat definitions for system specifications -- Produce threat / scenario data for BMDS development events -- Perform Threat Verification and Validation analysis to verify missile models meet specifications and are consistent with intelligence assessments. - Produce Adversary Data Package (ADP) updates. - Develop target requirements to ensure flight test targets meet operationally realistic conditions. - Produce Target Assessment and Certification Reports. - Assess threat representation of flight test targets. - Develop target system specifications and guide targets requirements development, planning, and certification for BMDS flight tests. - Analyze flight test target performance relative to threat intelligence assessments to support target system verification and certification. - Provide Technical Data for major reviews (System Requirements Reviews, Critical Design Reviews, etc.) - Complete Target Specification builds. - Update MDA INS 5000.06, Target Class Capabilities and Requirements documents as necessary. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>			
Accomplishments/Planned Programs Subtotals	44.696	44.708	44.078

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0305103C: Cyber Security Initiative	0.945	0.986	0.985	-	0.985	1.140	1.163	1.187	1.209	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

This project leverages expertise in the intelligence community, counterintelligence community, and information assurance community, including the Military Services, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and industry. The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution to the BMDS. Products and Services will be acquired by competitive means to the extent that is beneficial and practical.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Intelligence - Intelligence Analysis & Support	Allot	MDA : VA, AL, CO	16.867	3.832	Oct 2016	4.779	Oct 2017	4.046	Oct 2018	-		4.046	Continuing	Continuing	Continuing
Intelligence - Intelligence Support	C/CPFF	MIDAESS / TEAMS : AL, VA, CO	16.850	4.746	Nov 2016	4.988	Nov 2017	5.832	Nov 2018	-		5.832	Continuing	Continuing	Continuing
Intelligence - Intelligence Support (2)	C/CPFF	Northrop Grumman : AL, CO	1.431	0.625	Nov 2016	0.557	Nov 2017	0.308	Nov 2018	-		0.308	Continuing	Continuing	Continuing
Intelligence - Prior year Intelligence Support no longer funded in FYDP	Various	Various : Various	7.770	0.000		0.000		0.000		-		0.000	0.000	7.770	0.000
Counterintelligence - CI Analysis & Support	Allot	MDA : AL, CO, VA	6.938	1.468	Oct 2016	1.892	Oct 2017	3.075	Oct 2018	-		3.075	Continuing	Continuing	Continuing
Counterintelligence - CI Analysis and Support 3	C/CPFF	MIDAESS / TEAMS : AL, CO, VA	10.925	4.514	Nov 2016	4.020	Nov 2017	2.667	Nov 2018	-		2.667	Continuing	Continuing	Continuing
Counterintelligence - CI Insider Threat Analysis	C/CPFF	MIDAESS / TEAMS : VA	0.662	0.407	Nov 2016	0.000		0.000		-		0.000	0.000	1.069	0.000
Counterintelligence - CI Surveillance Gear	Various	Various : Various	0.000	0.000		1.007	Dec 2017	1.034	Dec 2018	-		1.034	Continuing	Continuing	Continuing
Cybersecurity Engineering Program - Cybersecurity - FFRDC	FFRDC	Aerospace : CA, VA	2.525	0.754	Nov 2016	0.384	Nov 2017	0.398	Nov 2018	-		0.398	Continuing	Continuing	Continuing
Cybersecurity Engineering Program - Cybersecurity - FFRDC (2)	FFRDC	MITRE : VA, AL	1.959	0.754	Nov 2016	1.145	Nov 2017	1.196	Nov 2018	-		1.196	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Cybersecurity Engineering Program - Cybersecurity Engineering	Allot	MDA : VA, AL	9.331	2.355	Oct 2016	2.467	Oct 2017	2.241	Oct 2018	-		2.241	Continuing	Continuing	Continuing
Cybersecurity Engineering Program - Cybersecurity Engineering CSS	C/CPFF	MIDAESS / TEAMS : VA, AL	1.733	1.095	Nov 2016	0.541	Nov 2017	0.737	Nov 2018	-		0.737	Continuing	Continuing	Continuing
Program Protection - Declassification Analysis	C/CPFF	MIDAESS / TEAMS : VA, AL	5.643	1.853	Nov 2016	2.183	Nov 2017	2.055	Nov 2018	-		2.055	Continuing	Continuing	Continuing
Program Protection - Program Protection Analysis	Allot	MDA : VA, AL	16.642	4.250	Oct 2016	4.550	Oct 2017	4.654	Oct 2018	-		4.654	Continuing	Continuing	Continuing
Program Protection - Program Protection Analysis & Support	C/CPFF	MIDAESS / TEAMS : AL, AK, CA, CO, VA	15.212	4.322	Nov 2016	4.665	Nov 2017	4.648	Nov 2018	-		4.648	Continuing	Continuing	Continuing
Program Protection - Program Protection Support	Various	Various : AL, VA, CO	2.177	0.540	Nov 2016	0.600	Nov 2017	0.532	Nov 2018	-		0.532	Continuing	Continuing	Continuing
Threat Systems Engineering - Threat Systems Engineering	Various	MDA : VA, AL, CO	8.433	5.558	Oct 2016	5.353	Oct 2017	4.522	Oct 2018	-		4.522	Continuing	Continuing	Continuing
Threat Systems Engineering - Threat Systems Engineering - CSS	C/CPFF	MIDAESS / TEAMS : AL, MD, VA	11.557	4.218	Nov 2016	0.000		0.000		-		0.000	15.775	31.550	0.000
Threat Systems Engineering - Threat Systems Engineering - CSS (2)	C/CPFF	MIDAESS / TEAMS : VA, AL	4.007	2.230	Nov 2016	2.971	Nov 2017	3.343	Nov 2018	-		3.343	Continuing	Continuing	Continuing
Threat Systems Engineering - Threat Systems Engineering - FFRDC	FFRDC	MIT/LL : MA	1.869	0.000		1.174	Nov 2017	1.196	Nov 2018	-		1.196	Continuing	Continuing	Continuing
Threat Systems Engineering - Threat	FFRDC	JHU/APL : MD	2.233	0.000		1.432	Nov 2017	1.594	Nov 2018	-		1.594	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering - UARC															
Threat Systems Engineering - Unique RCS	FFRDC	NSWC Corona : CA, MD	2.275	1.175	Nov 2016	0.000		0.000		-		0.000	3.450	6.900	0.000
Subtotal			147.039	44.696		44.708		44.078		-		44.078	Continuing	Continuing	N/A

Remarks
NASIC - National Air and Space Intelligence Center

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	147.039	44.696	44.708	44.078	-	44.078	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / <i>BMD Enabling Programs</i>	Project (Number/Name) MD28 / <i>Intelligence & Security</i>
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
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Remarks
 Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security
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	Significant Event Complete ▲			Milestone Decision Complete ★			Element Test Complete ◆			System Level Test Complete ●			Complete Activity ◆								
	Significant Event Planned △			Milestone Decision Planned ☆			Element Test Planned ◇			System Level Test Planned ○			Planned Activity ◇								
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
MD28 Intelligence & Security				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Adversary Data Package (ADP) - 2018						△															
Submit Annual MDA OPSEC Report to USD(I) - 2018						△															
Complete Annual Declassification Review - 2018						△															
ADP - 2019									△												
Submit Annual MDA OPSEC Report to USD(I) - 2019									△												
Complete Annual Declassification Review - 2019									△												
ADP - 2020												△									
Submit Annual MDA OPSEC Report to USD(I) - 2020												△									
Complete Annual Declassification Review - 2020												△									
ADP - 2021															△						
Submit Annual MDA OPSEC Report to USD(I) - 2021															△						
Complete Annual Declassification Review - 2021															△						
ADP - 2022																		△			
Submit Annual MDA OPSEC Report to USD(I) - 2022																		△			
Complete Annual Declassification Review - 2022																		△			
ADP - 2023																					△
Submit Annual MDA OPSEC Report to USD(I) - 2023																					△
Complete Annual Declassification Review - 2023																					△

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD28 / Intelligence & Security

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD28 Intelligence & Security	1	2018	4	2023
Adversary Data Package (ADP) - 2018	4	2018	4	2018
Submit Annual MDA OPSEC Report to USD(I) - 2018	4	2018	4	2018
Complete Annual Declassification Review - 2018	4	2018	4	2018
ADP - 2019	4	2019	4	2019
Submit Annual MDA OPSEC Report to USD(I) - 2019	4	2019	4	2019
Complete Annual Declassification Review - 2019	4	2019	4	2019
ADP - 2020	4	2020	4	2020
Submit Annual MDA OPSEC Report to USD(I) - 2020	4	2020	4	2020
Complete Annual Declassification Review - 2020	4	2020	4	2020
ADP - 2021	4	2021	4	2021
Submit Annual MDA OPSEC Report to USD(I) - 2021	4	2021	4	2021
Complete Annual Declassification Review - 2021	4	2021	4	2021
ADP - 2022	4	2022	4	2022
Submit Annual MDA OPSEC Report to USD(I) - 2022	4	2022	4	2022
Complete Annual Declassification Review - 2022	4	2022	4	2022
ADP - 2023	4	2023	4	2023
Submit Annual MDA OPSEC Report to USD(I) - 2023	4	2023	4	2023
Complete Annual Declassification Review - 2023	4	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs				Project (Number/Name) MD30 / BMD Information Management Systems			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD30: BMD Information Management Systems	325.017	84.671	84.499	79.979	-	79.979	88.786	87.686	90.970	93.890	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2018, consolidated \$4.343 million of IT funding from MD24 to MD30 for more efficient execution.

A. Mission Description and Budget Item Justification

The BMD Information Management Systems budget project funds information technology mission critical functions necessary for the efficient operations and safeguarding of BMD information in compliance with DoD policies and in keeping with the President's declaration on 29 May 2009, "cyber threat is one of the most serious economic and national security challenges we face as a nation". IT is critical to the day-to-day functions of MDA personnel to communicate (classified and unclassified) with each other, Congress, senior DoD and other U.S. government agency personnel, Combatant Commander's, NATO partners, and other industry partners. Communication among these organizations facilitates the MDA mission of developing and fielding an integrated BMDS to defend the United States, our deployed forces, allies, and friends against all ranges of enemy ballistic missiles in all phases of flight.

MDA information management systems capabilities support rigorous missile defense Research, Development, Test and Engineering (RDT&E) and facilitate the development of technologies to guard against evolving missile threat. Communications are vital for missile defense to continue a viable homeland defense against rogue threats and to provide the integration required to defend deployed forces, allies, and friends against theater threats. The BMD information management consists of MDA Special Purpose Processing Nodes (SPPNs), IT systems, data centers, operations and monitoring centers which are vital to support the strategic mission of the Agency and necessary to meet disaster recovery and continuity of operations requirements. This infrastructure is required to sustain access to the Secret Internet Protocol Router Network (SIPRNET), Non secure Internet Protocol Router Network (NIPRNET), MDA classified and unclassified networks, classified and unclassified video teleconferencing services, test and business knowledge data centers, the Defense Research Engineering Network (DREN). These mission critical functions provide for the efficient operation and safeguarding of all agency information in locations supporting MDA around the world.

Project MD30 was realigned into the following inter-agency mission critical IT services and the associated plans to align with the Federal Information Technology Shared Services Strategy.

1. End User Support
2. Special Purpose Processing Nodes (SPPNs)
3. IT Planning and Solutions
4. Unified Communications
5. Portal and Data Services
6. Business Automation Services

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Title: End User Support</p> <p align="right">Articles:</p> <p>Description: Provides IT operations, support and maintenance (18 hours a day, six days a week) to over 10,500 MDA worldwide users (classified and unclassified) executing the Research, Development, Test and Engineering (RDT&E) mission. Services include Integrated Service Desk support (Help Desk and Client Support Services); management of hardware and software maintenance and licensing; and monitoring network activity to ensure users comply with DoD policies for the proper use of information systems. Services also include printing and copying; email and file; directory and authentication services. Includes investments in equipment at end-of-life to comply with Federal and DoD mandated cybersecurity policies. Provides life-cycle management of over 190,000 IT assets including IT procurement, receiving, shipping/transportation, warehousing, transfers and disposal using the Defense Property Accountability System (DPAS). Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>	15.211 -	19.694 -	20.791 -
<p>Title: Special Purpose Processing Nodes (SPPNs) (formerly Network and Infrastructure Services)</p> <p align="right">Articles:</p> <p>Description: Provides for the developmental engineering and operational strategies and concepts; and planning, design, implementation and maintenance for MDA Research, Development, Test and Evaluation (RDT&E) Special Purpose Processing Nodes (SPPNs) in Huntsville, AL and Colorado Springs, CO. The SPPN infrastructure consists of routers, switches, firewalls, compute, storage and intrusion detection systems that provide IT support to over 10,500 MDA classified/unclassified users worldwide. The SPPNs support dynamic and rapid modifications and reconfigurations of network infrastructure in support of RDT&E mission and event unique configurations. Funds provide for network operations and performance monitoring; development of detailed solutions, designs, and plans; Disaster Recovery and Continuity of Operations (DR/COOP) rehearsals; Internet access management; and web filtering. Sustains core communications distribution services across the MDA Enterprise. Includes investments in equipment at end-of-life to comply with Federal and DoD mandated cybersecurity policies. Plan, engineer and implement sustainment projects for general IT services and business systems consistent with the IT architecture roadmap. Specific and/or unique accomplishments to each FY are as follows:</p>	28.130 -	19.301 -	10.964 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>FY 2018 Plans: The \$11.335 million decrease from FY 2017 to FY 2018 reflects the cost sharing strategy for SPPN services used by the MDA BMDS Programs to accomplish their RDT&E mission.</p> <p>- SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The \$7.587 million decrease from FY 2018 to FY 2019 reflects the cost sharing strategy for SPPN services used by the MDA BMDS Programs to accomplish their RDT&E mission and funded from multiple Program Elements.</p>			
<p>Title: Information Technology (IT) Planning and Solutions</p> <p align="right">Articles:</p> <p>Description: Provides IT engineering support for new requirements analysis, design, planning and implementation of IT solutions for real-world issues. Addresses the increasing demand for more complex IT products and highly specialized IT services. Manages the prioritization and integration of investments in the MDA IT Portfolio to ensure compliance with Federal and DoD polices. Supports the MDA Chief Information Officer Enterprise Architecture Board, Project Steering Committee and the Change Control Board. Ensures compliance with Federal Laws, DoD policies, directives and regulations including: Clinger-Cohen Act, the Federal Information Security Management Act (FISMA), and Office of Management and the Office of Management and Budget (OMB) IT budget reporting policies. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>	13.793 -	14.998 -	14.431 -
<p>Title: Unified Communications</p> <p align="right">Articles:</p>	15.548 -	14.998 -	16.973 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Description: Provides for the management, operations and sustainment of classified and unclassified globally deployed video teleconferencing capabilities and equipment. Also includes unclassified desktop instant messaging, wireless services, and collaboration capabilities. Provides and implements engineering solutions for all unified communications services. Supports MDA global RDT&E mission for classified and unclassified voice and data circuits (wide area, local area and metropolitan area networks) and interfaces with the Defense Information System Network (DISN) Video Services Global (DVSG), the Defense Research and Engineering Network (DREN), Joint Service Provider (JSP) and commercial vendors. Maintenance agreements and licenses for MDA Enterprise network and telecommunications equipment (classified and unclassified mobile and desktop telephony devices). Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY 2018 to FY 2019 reflects additional support and sustainment requirements for asset management, test operations tempo and bandwidth expansion due to the increased global mission.</p>			
<p>Title: Business Automation Services</p> <p align="right">Articles:</p> <p>Description: Provides for the management, operation and maintenance of enterprise business applications for the MDA community to access and share various sources of available data, information and knowledge and enable improved organization, retrieval, manipulation, and storage. Operate and maintain nine Defense Business Systems that meet the reporting requirements of Title 10 United States Code section 2222; these include portal-based Electronic Learning Management System (E-LMS), Program Resource Internet Database Environment (PRIDE), Information Management Program Activity control Tool (IMPACT), Standard Procurement System (SPS), Human Resource Tracking System/Personnel Tracking System (HRTS/PTS), TEAMMATE, E-TASKER, Comprehensive Cost and Requirements (CCaR), Electronic Content and Records Tool (ECART). Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans:</p>	6.052 -	8.087 -	9.255 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- SEE ABOVE.			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> The increase from FY 2018 to FY 2019 reflects evolving requirements for DoD mandated knowledge and records management and reporting, defense business system reporting and sustainment costs for business applications.			
<i>Title:</i> Portal and Data Services	5.937	7.421	7.565
<i>Articles:</i>	-	-	-
<i>Description:</i> Provides for the management, operation and maintenance support for the classified and unclassified MDA Portal application and the IT portal infrastructure. The support includes web-based developmental engineering and operations, planning, design, application implementation, content management and training. Also provides MDA Privacy Office and Civil Liberties compliance and reporting, and manages data storage capacity to accommodate MDA users. Specific and/or unique accomplishments to each FY are as follows:			
<i>FY 2018 Plans:</i> - SEE ABOVE.			
<i>FY 2019 Plans:</i> - SEE ABOVE.			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> N/A			
Accomplishments/Planned Programs Subtotals	84.671	84.499	79.979

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603176C: <i>Advanced Concepts and Performance Assessment</i>	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
• 0603178C: <i>Weapons Technology</i>	47.403	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603180C: <i>Advanced Research</i>	27.185	20.184	20.365	-	20.365	20.778	21.194	21.652	22.036	Continuing	Continuing
• 0603294C: <i>Common Kill Vehicle Technology</i>	54.395	252.879	189.753	-	189.753	205.645	254.130	122.494	52.373	Continuing	Continuing
• 0603881C: <i>Ballistic Missile Defense Terminal Defense Segment</i>	197.171	292.262	214.173	-	214.173	199.399	197.451	174.161	152.174	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018	
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs				Project (Number/Name) MD30 / BMD Information Management Systems			

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	37.809	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	20.910	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603898C: <i>Ballistic Missile Defense Joint Warfighter Support</i>	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603913C: <i>Israeli Cooperative Programs</i>	268.735	105.354	300.000	-	300.000	300.000	300.000	300.000	300.000	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing
• 0604880C: <i>Land Based SM-3 (LBSM3)</i>	40.452	30.486	27.692	-	27.692	29.263	28.370	27.228	28.225	Continuing	Continuing
• 0604881C: <i>AEGIS SM-3 Block IIA Co-Development</i>	102.272	9.739	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	112.011

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0901598C: <i>Management HQ - MDA</i>	30.693	29.947	28.626	-	28.626	27.276	27.894	28.466	29.005	Continuing	Continuing

Remarks

D. Acquisition Strategy

This acquisition strategy to provide IT services for MDA consists of three MDA issued contracts. The Joint National Integration Center Research and Development Contract (JRDC) provides IT design, engineering, implementation and sustainment services. The JRDC contract expires January 2018 and was re-competed as Full and Open under the name of Integrated Research and Development for Enterprise Solutions (IRES). The IRES transition team was awarded with work started end of FY 2017.

The Network Management Resources (NMR) contract provides Video Teleconferencing, Portal, Data and Business Automation services. The NMR contract expires in March 2018 and is being re competed as a Service Disabled Veteran Owned Small Business Set Aside under the new name of Research & Development Enterprise Collaboration Services (RECS).

MDA issues multiple Military Interdepartmental Purchase Requisitions (MIPRs) for leased communications including DISA, DREN and the US Army.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
End User Support - Consolidated Support Logistics/Asset Mgmt	C/CPFF	Venturi : AL, CO	0.000	0.000		0.000		0.514	Nov 2018	-		0.514	Continuing	Continuing	Continuing
End User Support - End User Civilian Pay/Travel/PCS	Allot	MDA Civilian Pay/TDY/PCS : AL, CO, NM, VA	11.685	3.148	Oct 2016	3.213	Oct 2017	3.117	Oct 2018	-		3.117	Continuing	Continuing	Continuing
End User Support - End User Civilian Travel	Allot	MDA Civilian Travel : AL, AK, CA, CO, HI, NM, VA	0.875	0.218	Oct 2016	0.232	Oct 2017	0.000		-		0.000	0.000	1.325	0.000
End User Support - End User IT Hardware/Software Support	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	25.167	5.075	Oct 2016	7.071	Feb 2018	6.130	Nov 2018	-		6.130	Continuing	Continuing	Continuing
End User Support - End User IT Licenses	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	10.676	1.161	Oct 2016	1.744	Feb 2018	5.262	Nov 2018	-		5.262	Continuing	Continuing	Continuing
End User Support - End User Operational Support	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	37.886	5.609	Oct 2016	7.434	Feb 2018	5.768	Oct 2018	-		5.768	Continuing	Continuing	Continuing
Special Purpose Processing Nodes (SPPNs) (formerly Network and Infrastructure)	Allot	MDA Civilian Pay : AL, CO, VA	4.716	1.259	Oct 2016	1.280	Oct 2017	1.326	Oct 2018	-		1.326	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Services) - SPPN Civilian Pay/Travel/PCS															
Special Purpose Processing Nodes (SPPNs) (formerly Network and Infrastructure Services) - SPPN Licenses	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CO, VA	51.350	13.450	Oct 2016	9.037	Feb 2018	6.525	Nov 2018	-		6.525	Continuing	Continuing	Continuing
Special Purpose Processing Nodes (SPPNs) (formerly Network and Infrastructure Services) - SPPN Operational Support	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CO, VA	49.997	13.421	Oct 2016	8.984	Feb 2018	3.113	Nov 2018	-		3.113	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions - Consolidated Support, IT Planning and Solutions	C/CPFF	Colsa : AL, CO, VA	10.633	4.423	Mar 2017	5.755	Mar 2018	5.423	Nov 2018	-		5.423	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions - IT Planning and Solutions Civilian Pay/Travel/PCS	Allot	MDA Civilian Pay : AL, CO, VA	3.632	1.785	Oct 2016	0.960	Oct 2017	1.823	Oct 2018	-		1.823	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions - IT Planning and Solutions OMB, OSD, and DOD Compliance Monitoring and Reporting/Contract Deliverable	C/CPFF	Colsa : AL, CO, VA	0.834	0.000		0.128	Mar 2018	0.000		-		0.000	0.000	0.962	0.000
Information Technology (IT) Planning and Solutions - IT Planning and Solutions Operational Support	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CO, VA	23.043	7.585	Feb 2017	8.155	Feb 2018	7.185	Oct 2018	-		7.185	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions	Allot	MDA Business Operations : AL, CO, VA	1.904	0.000		0.000		0.000		-		0.000	0.000	1.904	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
- MDA Agency Business Operations															
Unified Communications - Unified Communications Civilian Pay/Travel/PCS	Allot	MDA Civilian Pay : AL, CO, VA	4.505	0.796	Oct 2016	1.120	Oct 2017	0.994	Oct 2018	-		0.994	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Leased Communications/ Licenses	MIPR	DISA/DREN/IT2S : AL, AK, CA, CO, HI, NM, VA	15.777	2.891	Oct 2016	2.813	Oct 2017	3.102	Oct 2018	-		3.102	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Operational Support	C/CPAF	JRDC / IRES : AL, CO, VA	6.835	2.047	Feb 2017	2.088	Feb 2018	4.062	Oct 2018	-		4.062	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Wireless Services	C/FFP	AT&T : AL, CO, VA	2.121	1.471	Nov 2016	2.011	Nov 2017	1.998	Nov 2018	-		1.998	Continuing	Continuing	Continuing
Unified Communications - VTC HW Licenses	C/CPIF	NMR / TBD : AL, CO, VA	0.000	1.800		0.000		1.736	Nov 2018	-		1.736	Continuing	Continuing	Continuing
Unified Communications - VTC HW/Break-Fix	C/CPIF	NMR / TBD : AL, CO, VA	0.000	1.209		0.000		1.267	Nov 2018	-		1.267	Continuing	Continuing	Continuing
Unified Communications - VTC Operations Support	C/CPIF	NMR / TBD : AL, AK, CO, NM, VA	22.113	5.334	Nov 2016	6.966	Nov 2017	3.814	Nov 2018	-		3.814	Continuing	Continuing	Continuing
Business Automation Services - Business Automation Civilian Pay/ Travel/PCS	Allot	MDA Civilian Pay : AL, CO, VA	2.715	0.318	Oct 2016	0.480	Oct 2017	0.331	Oct 2018	-		0.331	Continuing	Continuing	Continuing
Business Automation Services - Business Automation Licenses	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CO, VA	3.562	0.934	Oct 2016	0.953	Feb 2018	0.972	Nov 2018	-		0.972	Continuing	Continuing	Continuing
Business Automation Services - Business Automation Operational Support	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CO, VA	10.246	4.779	Oct 2016	6.632	Feb 2018	7.930	Nov 2018	-		7.930	Continuing	Continuing	Continuing
Business Automation Services - Business	MIPR	CACI : AL, CO, VA	0.059	0.021	Oct 2016	0.022	Oct 2017	0.022	Mar 2019	-		0.022	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Automation Services Support															
Portal and Data Services - Portal and Data Services Civilian Pay/Travel/PCS	Allot	MDS Civilian Pay : AL, CO, VA	3.632	0.796	Oct 2016	0.800	Oct 2017	0.829	Oct 2018	-		0.829	Continuing	Continuing	Continuing
Portal and Data Services - Portal and Data Services Licenses and Maintenance	C/CPAF	Northrop Grumman / Jaobs Engineering : AL, CO, VA	6.789	1.800	Oct 2016	1.627	Feb 2018	1.661	Nov 2018	-		1.661	Continuing	Continuing	Continuing
Portal and Data Services - Portal and Data Services Operational	C/CPAF	Online Subscriptions Services : AL, CO, VA	1.430	0.419	Oct 2016	0.408	Oct 2017	0.417	Oct 2018	-		0.417	Continuing	Continuing	Continuing
Portal and Data Services - Portal and Data Services Operational Support	C/FFP	NMR / TBD : AL, CO, VA	12.835	2.922	Oct 2016	4.586	Nov 2017	4.658	Nov 2018	-		4.658	Continuing	Continuing	Continuing
Subtotal			325.017	84.671		84.499		79.979		-		79.979	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems
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Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	325.017	84.671	84.499	79.979	-	79.979	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems
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	Significant Event Complete ▲			Milestone Decision Complete ★			Element Test Complete ◆			System Level Test Complete ●			Complete Activity ◆								
	Significant Event Planned △			Milestone Decision Planned ☆			Element Test Planned ◇			System Level Test Planned ○			Planned Activity ◇								
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
Operate, Monitor and Sustain Recurring Operations for Video Teleconferencing for Unified Communications Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Manage DoD Mandated Business Applications and Sustain MDA Financial and Contractual Support Systems - Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Operate and Maintain General Information Technology Services 18 hours per day, 6 days per week - Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Revise and Test Contingency Plans for Information Technology Systems - Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Operate and Maintain Classified and Unclassified MDA Knowledge Online Services - Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Procure, Implement, and Asset Control for Information Technology Operational Systems -Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Provide 18 hours per day, 6 days per week Network and Helpdesk Services for General Information Technology Services for MDA Workforce - Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Fund Recurring Leased Circuits, Maintenance Agreements and Licenses for MDA Enterprise - Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Operate, Monitor and Sustain Recurring Classified and Unclassified Telecommunication Requirements for Unified Communications - Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Sustain the BMDS Integrated Master Schedule and the Ballistic Missile Defense Asset Management Tool - Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Perform Analysis, Track, and Report Metrics on Equipment Lifecycle - Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Sustain the Information Technology Infrastructure Across the MDA Enterprise - Follow-On				◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD30 / BMD Information Management Systems

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Operate, Monitor and Sustain Recurring Operations for Video Teleconferencing for Unified Communications Follow-On	1	2018	4	2023
Manage DoD Mandated Business Applications and Sustain MDA Financial and Contractual Support Systems - Follow-On	1	2018	4	2023
Operate and Maintain General Information Technology Services 18 hours per day, 6 days per week - Follow-On	1	2018	4	2023
Revise and Test Contingency Plans for Information Technology Systems - Follow-On	1	2018	4	2023
Operate and Maintain Classified and Unclassified MDA Knowledge Online Services - Follow-On	1	2018	4	2023
Procure, Implement, and Asset Control for Information Technology Operational Systems -Follow-On	1	2018	4	2023
Provide 18 hours per day, 6 days per week Network and Helpdesk Services for General Information Technology Services for MDA Workforce - Follow-On	1	2018	4	2023
Fund Recurring Leased Circuits, Maintenance Agreements and Licenses for MDA Enterprise - Follow-On	1	2018	4	2023
Operate, Monitor and Sustain Recurring Classified and Unclassified Telecommunication Requirements for Unified Communications - Follow-On	1	2018	4	2023
Sustain the BMDS Integrated Master Schedule and the Ballistic Missile Defense Asset Management Tool - Follow-On	1	2018	4	2023
Perform Analysis, Track, and Report Metrics on Equipment Lifecycle - Follow-On	1	2018	4	2023
Sustain the Information Technology Infrastructure Across the MDA Enterprise - Follow-On	1	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs				Project (Number/Name) MC30 / Cyber Operations			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC30: <i>Cyber Operations</i>	58.697	43.589	41.458	63.112	-	63.112	66.286	72.775	68.150	56.599	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY17 reflects a Congressional add for Cybersecurity training and enhancements of \$20M and some internal realignments for cybersecurity investments for Secretary of Defense priority effort in the Cybersecurity Four Lines of Effort.

Beginning in FY 2018, this MC30 Cyber Operations Budget Project will consist of new Accomplishments that will map to the Office of Management and Budget (OMB) and Office of the Secretary of Defense (OSD) approved Cybersecurity Taxonomy. The new Accomplishments are: 1) Preventing Malicious Activity; 2) Detect, Analyze and Mitigate Intrusions, 3) Planning, Policy Development and Workforce Management and 4) Continuous Monitoring.

In FY 2018, \$10.585 million of IT funding was realigned from MD24 to MC30 for Cyber Operations priority efforts.

In FY 2019, new Accomplishment "Outside Federal Outreach, Defense Industrial Base" was added with \$162 thousand realigned from the Detect, Analyze and Mitigate.

A. Mission Description and Budget Item Justification

A number of key IT strategies were identified in the DoD Information Technology Enterprise Strategy and Roadmap issued by the Deputy Secretary of Defense in 2011. The IT Roadmap specifically addresses the need to improve Cybersecurity. It states that DoD networks are under constant attack from cybersecurity threats launched from various sources. MDA must meet the National Command Authority Directives for rapid deployment of the BMDS while complying with the key principles of the Cybersecurity standards to ensure MDA remains a secure member of the DoD Information Network (DODIN).

DoD Instruction 8500.01 Cybersecurity issued in March 2014, requires continuous monitoring, data analysis, reporting and incident mitigation of DoD classified and unclassified, mission, test and administrative networks. To comply with the Instruction, MDA must implement a multi-tiered cybersecurity risk management capability to protect critical BMD data and systems from rapidly evolving internal and external threats.

The issuance of DoD Instruction 8510.01, Risk Management Framework (RMF) Information Technology in March 2014 requires additional resources to implement, manage, monitor and report as a result of a thirty-five percent increase in controls (237 controls with 817 enhancements). DoD 8510.01 also states that resources for implementing the RMF must be identified and allocated as part of the Defense planning, programming, budgeting, and execution process. The Controls must be tested on all IT supporting research, development, test and evaluation and DoD-controlled IT operated by a contractor or other entity on behalf of DoD and reported.

The Cyber Operations budget project in the Enabling Program Element is executed by the MDA Chief Information Officer who has responsibility over the Agency Authorizing Official (AO). The project provides funds to sustain the Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Systems Security Officer (PM/ISSO) Plan of Action and Milestones (POA&M) for the MDA mission, test and administrative systems. It maintains the Certification and Accreditation (C&A) data repository, capturing the RMF

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / <i>BMD Enabling Programs</i>	Project (Number/Name) MC30 / <i>Cyber Operations</i>
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documentation (artifacts, validation results, and Cybersecurity Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and POA&M on all MDA information systems. It supports the monitoring and tracking of Cybersecurity mitigations detailed in IT security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA PM/ISSO and AO. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with Federal Information Security Management Act(FISMA).

This project funds the MDA Security Operations Center (SOC), responsible for monitoring, managing, patching, and maintaining MDA network and core IT services; issuing and tracking Technical Compliance Orders; and coordinating overarching Enterprise NetOps. The SOC provides the network security operations centers and supporting processes to protect and defend BMDS and the MDA Enterprise information and information systems.

The MDA Computer Emergency Response Team (CERT), funded in this project, monitors the classified and unclassified information technology MDA administrative IT networks and reports vulnerabilities. The MDA CERT coordinates with U.S. Cyber Command to identify and implement network vulnerability updates and patches to comply with U.S. Cyber Command vulnerabilities identified for DoD networks.

The project funds Cybersecurity governance management and administrative management support, annual Agency-wide computer-based IA training and metrics reporting, implementation of Public Key Infrastructure and Enabling and COMSEC related activities.

Beginning in FY 2018, new Accomplishments will map to the Cybersecurity Taxonomy approved by OMB and OSD. The following are the recurring activities in each new accomplishment.

Recurring Activities for the Prevent Malicious Cyber Attacks Accomplishment:

- Maintain a current Information Assurance risk and residual risk assessment of the BMDS.
- Provide coordination on all IT projects and remote sites for Cybersecurity compliance.
- Implement methodologies and goals to identify insecure and unauthorized vectors of access to networks or applications, analyze the threat, attempt to exploit the vectors and confirm existence and analyze the risk for exploiting an application, network or service.
- Track ports, protocols, and services.
- Coordinate with private partnerships to ensure the Defense Industrial Base protects MDA data.

Recurring Activities for the Detect, Analyze and Mitigate Intrusions Accomplishment:

- Test RMF controls on all IT supporting research, development, test and evaluation and DoD-controlled IT operated by a contractor or other entity on behalf of DoD and reported.
- Conduct RMF analysis and reporting for the BMDS such as evaluation of residual risk by incorporating current and proposed BMDS monitoring and mitigations.
- Maintain MDA Computer Emergency Response Team (MDA CERT) as a fully accredited Tier II Computer Network Defense Service provider (CNDSP) in accordance with CJCSI 6510.01F and DoD O-8530.1.
- Perform CNDSP services (protect, detect, respond and sustain) for all MDA Admin/General Services, MDA Mission and test networks and enclaves 24 hours per day, seven days a week, 365 days a year.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC30 / Cyber Operations
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- Conduct application testing that looks for vulnerabilities and issues using a number of tactics, technical and procedures.
- Conduct vulnerability scanning of MDA network to assess risks to MDA data from inside and outside sources.
- Conduct monthly information assurance vulnerability audits.
- Issue and track implementation of Information Assurance Vulnerability Alerts (IAVA), Bulletins and Technical Advisories.
- Implement Information Assurance Vulnerability Alerts (IAVA) and Communication Tasking Orders remediation and patches.
- Perform network security monitoring of all MDA subscriber networks and enclaves.
- Conduct system forensic analysis, review content of compromised system, document files and data, and identify tactics, techniques and procedures used by an attacker to gain access.
- Develop and maintain the RMF package for the BMDS Mission System to support a full Authorization to Operation (ATO).
- Compile and validate BMDS Mission Element-level certification and accreditation documents to include BMDS Element-level SIPs, DIPs, C&A Scorecards, POA&M artifacts (CVT -Ensure MDA mission, test, and administrative systems are operated securely in accordance with DoD Information Assurance Certification and Accreditation policies.
- Prepare and maintain current certification and accreditation documentation for general service networks reported to DoD and Office of Management and Budget.

Recurring Activities for the Planning, Policy Development, Workforce Training and Force Management Accomplishment:

- Document and maintain Standard Operating Instructions/Procedures for consistent interface with the MDA BMDS Network Operations Support Center (BNOSC) and the BMDS elements.
- Publish MDA policies to incorporate new requirements stated in DoDI 8510.01 Risk Management Framework (RMF) to comply with 237 new controls and 817 control enhancements into controls validation testing of BMDS elements and networks.
- Manage the Information Assurance Workforce Improvement Program to certify Cybersecurity professionals and report compliance in accordance with Federal Information Security Management Act (FISMA) and Information Assurance Workforce Improvement Program (DoD Manual 8570.1), achieving the DoD certification goal; reports IA Risk Assessments, Primary RMF artifacts.
- Interface with Central Command (CENTCOM) to provide BMDS Mission RMF package.
- Conduct an annual IA Security review of the BMDS in accordance with DoDI 8510.01 and provide an analysis of changes in IA posture.
- Collect, analyze, and report vulnerability and cyber warfare attack metrics to the MDA CIO, MDA leadership, and U.S. Cyber Command.

- Provide Information Assurance engineering and planning guidance and vulnerability assessment for all MDA Information Technology acquisition programs.

Recurring Activities for the Continuous Monitoring Accomplishment:

- Manage data-at-rest encryption to ensure compliance with Global Information Grid mandated policies.
- Procure/renew cybersecurity software maintenance agreements for IT Security Tools.
- Procure/renew cybersecurity hardware maintenance for hardware.

New Accomplishment beginning in FY 2019:

Outside Federal Service Outreach - Defense Industrial Base

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
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<p>- Participate and liaison with the Defense Security Service (DSS), MDA organizations and industry partners to conduct site visits and inspections to improve network monitoring capabilities at classified contractor sites to ensure protection of MDA BMDS data.</p> <p>-Assist with the analysis of network scans of industry partner networks and mitigation of risks to BMDS data.</p>				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>Title: Information Assurance/Computer Network Defense (IA/CND)</p> <p align="right">Articles:</p> <p>Description: Provides for the certification of Information Technology networks and systems, monitoring and computer emergency response services. Beginning in FY18, new Accomplishments align to the OSD/OMB Cybersecurity Taxonomy.</p> <p>FY 2018 Plans: N/A</p> <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>		43.589	0.000	0.000
		-	-	-
<p>Title: Detect, Analyze and Mitigate Intrusions</p> <p align="right">Articles:</p> <p>Description: Beginning in FY 2018, this new Accomplishment will map to the Office of Management and Budget (OMB) and the Office of the Secretary of Defense (OSD) approved Cybersecurity Taxonomy. The cybersecurity activities funded within this Accomplishment include: Federal Incident Response Centers; National Institute of Standards for Technology (NIST) SP 800.53 Implementation; Cyber Threat Analysis; Cyber Continuity of Operations (COOP); Incident Response and Remediation; Forensics and Damage Assessment; and Computer Emergency Response Teams. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The overall increase of \$11,757 includes the realignment of \$13,447 of Agency Cybersecurity funding from multiple RDT&E Program Elements for centralized visibility of cybersecurity investments to implement the Office of the Secretary of Defense four</p>		0.000	24.300	36.057
		-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC30 / Cyber Operations
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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lines of effort and Risk Management Framework (RMF) activities across MDA programs. It also includes a proportional decrease of \$1,690 for revised inflation rates and decreases for Defense Acquisition Workforce Development Fund based on MDA usage.

Title: Preventing Malicious Cybersecurity Activity	0.000	9.685	18.738
Articles:	-	-	-

Description: Beginning in FY 2018, this new Accomplishment will map to the Office of Management and Budget (OMB) and the Office of the Secretary of Defense (OSD) approved Cybersecurity Taxonomy. The efforts funded in this Accomplishment include: Federal Information Security Management Activity Act (FISMA)-related activities; Intrusion Prevention Systems; Trusted Internet Connections; Identity Management and Authentication; Supply Chain Management; Network & Data Protection and Insider Threat Mitigation Activities.

In FY2018, \$4.2 million was added to this Accomplishment to execute BMDS Positioning, Navigation and Timing (PNT) Last Mile Integration for six (6) Ballistic Missile Defense System (BMDS) sites leveraging the DoD Chief Information Officer Regional Clock installations at BMDS locations. This effort includes integration and test capabilities for element interface verification and provide operations and sustainment of the deployed PNT Last Mile integration capabilities at BMDS locations. Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:
-SEE ABOVE.

FY 2019 Plans:
-SEE ABOVE.

FY 2018 to FY 2019 Increase/Decrease Statement:
The \$9.053M increase from FY 2018 to FY 2019 reflects the realignment of cybersecurity activities previously identified in the Detect, Analyze and Mitigate Intrusions Accomplishment and also reflects the increasing requirements for support to accomplish cybersecurity activities necessary to protect and defend MDA systems and networks.

Title: Continuous Monitoring	0.000	4.827	5.134
Articles:	-	-	-

Description: Beginning in FY 2018, this new Accomplishment will map to the Office of Management and Budget (OMB) and the Office of the Secretary of Defense (OSD) approved Cybersecurity Taxonomy. The cybersecurity activities funded within this Accomplishment include: IT Security Tools and Other Continuous Monitoring. Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC30 / Cyber Operations		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
- SEE ABOVE. FY 2019 Plans: - SEE ABOVE. FY 2018 to FY 2019 Increase/Decrease Statement: N/A				
Title: Planning, Policy Development, Workforce Training & Force Management Description: Beginning in FY 2018, this new Accomplishment will map to the Office of Management and Budget (OMB) and the Office of the Secretary of Defense (OSD) approved Cybersecurity Taxonomy. The cybersecurity activities funded within this Accomplishment include: National Initiative for Cybersecurity Education (NICE); Workforce Development; Security Training for Employees with Significant Security Responsibilities; and Cybersecurity Strategic Planning, Policy, Oversight and Management. Specific and/or unique accomplishments to each FY are as follows: FY 2018 Plans: - SEE ABOVE. FY 2019 Plans: - SEE ABOVE. FY 2018 to FY 2019 Increase/Decrease Statement: N/A		0.000 -	2.646 -	3.017 -
Title: Outside Federal Outreach - Defense Industrial Base Description: Activities in this new Accomplishment includes reviewing current Cybersecurity Policies and coordinating with MDA BMDS Programs to ensure all applicable Cybersecurity clauses are included into MDA contracts with MDA Industry partners in the Defense Industrial Base (DIB) to ensure protection of Ballistic Missile Defense System (BMDS) Controlled Unclassified Information (CUI). Specific and/or unique accomplishments to each FY are as follows: FY 2018 Plans: N/A FY 2019 Plans:		0.000 -	0.000 -	0.166 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC30 / Cyber Operations
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- SEE ABOVE.			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> N/A			
Accomplishments/Planned Programs Subtotals	43.589	41.458	63.112

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC30 / Cyber Operations
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-	-	-	-	-	-	-	-	-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Information Assurance/Computer Network Defense (IA/CND) - BMDS IA Advisory and Assistance Services	C/CPFF	Booz Allen Hamilton : AL, CO, VA	2.950	2.446	Oct 2016	0.000		0.000		-		0.000	0.000	5.396	0.000
Information Assurance/Computer Network Defense (IA/CND) - CND/IA Advisory and Assistance Services	C/CPFF	Torch Technologies : AL, CO, VA	7.950	2.805	Oct 2016	0.000		0.000		-		0.000	0.000	10.755	0.000
Information Assurance/Computer Network Defense (IA/CND) - CND/IA Civilian Travel	Allot	MDA Civilian Travel : AL, AK, CA, CO, HI, NM, VA	0.416	0.215	Oct 2016	0.000		0.000		-		0.000	0.000	0.631	0.000
Information Assurance/Computer Network Defense (IA/CND) - CND/IA Civilian pay/Travel/PCS	Allot	MDA Civilian Pay : AL, CO, VA	6.692	2.917	Oct 2016	0.000		0.000		-		0.000	0.000	9.609	0.000
Information Assurance/Computer Network Defense (IA/CND) - CND/IA Licenses	C/CPAF	Northrop Grumman : AL, CO, VA	6.661	5.218	Oct 2016	0.000		0.000		-		0.000	0.000	11.879	0.000
Information Assurance/Computer Network Defense (IA/CND) - CND/IA Operational Support	C/FFP	Northrop Grumman : AL, CO, VA	27.025	16.647	Oct 2016	0.000		0.000		-		0.000	0.000	43.672	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC30 / Cyber Operations
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Information Assurance/ Computer Network Defense (IA/CND) - CND/ IA, CCRI, Comsec	MIPR	NSA/DISA : AL, CO, VA	0.332	0.409	Oct 2016	0.000		0.000		-		0.000	0.000	0.741	0.000
Information Assurance/ Computer Network Defense (IA/CND) - Cyber Compliance Projects	C/CPAF	Northop Grumman : AL, CO, VA	6.671	12.932		0.000		0.000		-		0.000	0.000	19.603	0.000
Detect, Analyze and Mitigate Intrusions - A&AS Cyber IT Mgmt	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.000		0.164	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - A&AS, BMDS CSM/CND	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.000		1.140	Mar 2018	1.452	Mar 2019	-		1.452	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - A&AS, Cyber Risk Mgmt	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.000		2.856	Mar 2018	3.916	Mar 2019	-		3.916	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - Civilian Pay	Allot	Civilian Pay : AL, CO, NM,, VA	0.000	0.000		3.255	Oct 2017	2.320	Oct 2018	-		2.320	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - Cyber CSS	C/CPAF	JRDC / IRES : AL, CO, VA	0.000	0.000		12.685	Feb 2018	28.369	Jan 2019	-		28.369	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - PNT, CSS	C/CPAF	JRDC / IRES : AL, CO, VA	0.000	0.000		4.200	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Preventing Malicious Cybersecurity Activity - A&AS IT Mgmt	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.000		0.328	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Preventing Malicious Cybersecurity Activity - Civpay	Allot	Civilian Pay : AL, CO, VA, NM	0.000	0.000		2.945	Oct 2017	1.740	Mar 2019	-		1.740	Continuing	Continuing	Continuing
Preventing Malicious Cybersecurity Activity -	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.000		0.570	Apr 2018	0.904	Mar 2019	-		0.904	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC30 / Cyber Operations
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Consolidated Support CSM															
Preventing Malicious Cybersecurity Activity - Cyber CSS	C/CPAF	JRDC / IRES : AL, COL, VA	0.000	0.000		5.842	Feb 2018	16.094	Jan 2019	-		16.094	Continuing	Continuing	Continuing
Continuous Monitoring - Continuous Monitoring - IT Security Tools	C/CPAF	Northrop Grumman / TBD : AL, CO, VA	0.000	0.000		4.827		5.134	Jan 2019	-		5.134	Continuing	Continuing	Continuing
Planning, Policy Development, Workforce Training & Force Management - A&AS Cyber BMDS CSM/CND	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.000		0.612	Mar 2018	1.779		-		1.779	Continuing	Continuing	Continuing
Planning, Policy Development, Workforce Training & Force Management - A&AS Cyber CRM	C/CPFF	TEAMS, TBD : AL, CO, VA	0.000	0.000		0.329	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Planning, Policy Development, Workforce Training & Force Management - Civilian PayTravel/PCS	Allot	Civilian Pay : AL, CO, NM, VA	0.000	0.000		1.705	Oct 2017	1.238		-		1.238	Continuing	Continuing	Continuing
Outside Federal Outreach - Defense Industrial Base - Civpay	Allot	MDA Civilian Pay : AL, CO, NM, VA	0.000	0.000		0.000		0.166	Oct 2018	-		0.166	Continuing	Continuing	Continuing
Subtotal			58.697	43.589		41.458		63.112		-		63.112	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	58.697	43.589	41.458	63.112	-	63.112	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / <i>BMD Enabling Programs</i>	Project (Number/Name) MC30 / <i>Cyber Operations</i>
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Remarks N/A									

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC30 / Cyber Operations
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	Significant Event Complete ▲			Milestone Decision Complete ★			Element Test Complete ◆			System Level Test Complete ●			Complete Activity ◆								
	Significant Event Planned △			Milestone Decision Planned ☆			Element Test Planned ◇			System Level Test Planned ○			Planned Activity ◇								
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
PNT Operations and Maint							◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
PNT Test Capabilities							◆	◆	◆												
PNT BMDS Last Mile Capability Operations & Sustainment						◆															
PNT Last Mile Integration 3 Additional BMDS Sites						◆															
PNT Last Mile Integration 3 BMDS Sites						◆	◆														
PNT interface testing equipment						◆	◆	◆													
Report Vulnerability and Cyber Warfare Attack Metrics to the MDA Chief Information Officer, MDA Leadership, and Cyber Command - Follow-On				◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Monitor Networks and Systems to Defend Mission, Test, and Administrative Systems on a 24 hours per day, 7 days per week, 365 days per year basis for Information Assurance - Follow-On				◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Provide Information Assurance Engineering and Planning Guidance and Vulnerability Assessment for Information Technology Acquisition Programs - Follow-On				◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Procure, Implement, and Asset Control of Hardware maintenance and Software Licenses for Monitoring Systems of Information Assurance - Follow-On				◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Conduct Information Assurance Certification Evaluation of Mission, Test, and Administrative Systems - Follow-On				◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Complete Annual Information Assurance user Training for MDA Workforce - Follow-On				◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Implement Information Assurance Vulnerability Alert Control Improvements for General Information Technology Services - Follow-On				◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC30 / Cyber Operations
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
PNT Operations and Maint	1	2019	4	2023
PNT Test Capabilities	2	2019	4	2019
PNT BMDS Last Mile Capability Operations & Sustainment	4	2018	4	2018
PNT Last Mile Integration 3 Additional BMDS Sites	4	2018	4	2018
PNT Last Mile Integration 3 BMDS Sites	3	2018	4	2018
PNT interface testing equipment	2	2018	4	2018
Report Vulnerability and Cyber Warfare Attack Metrics to the MDA Chief Information Officer, MDA Leadership, and Cyber Command - Follow-On	1	2018	4	2023
Monitor Networks and Systems to Defend Mission, Test, and Administrative Systems on a 24 hours per day, 7 days per week, 365 days per year basis for Information Assurance - Follow-On	1	2018	4	2023
Provide Information Assurance Engineering and Planning Guidance and Vulnerability Assessment for Information Technology Acquisition Programs - Follow-On	1	2018	4	2023
Procure, Implement, and Asset Control of Hardware maintenance and Software Licenses for Monitoring Systems of Information Assurance - Follow-On	1	2018	4	2023
Conduct Information Assurance Certification Evaluation of Mission, Test, and Administrative Systems - Follow-On	1	2018	4	2023
Complete Annual Information Assurance user Training for MDA Workforce - Follow-On	1	2018	4	2023
Implement Information Assurance Vulnerability Alert Control Improvements for General Information Technology Services - Follow-On	1	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs				Project (Number/Name) MD31 / Modeling & Simulation			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD31: <i>Modeling & Simulation</i>	165.404	46.513	49.824	89.786	-	89.786	97.004	135.297	48.670	49.030	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2018 to FY 2019 reflects M&S updates required to improve BMDS VV&A outcomes to address required OTA accreditation plan for all BMDS Elements, which will provide additional confidence in BMDS performance to the Warfighter. Also reflects completion of BMDS-level Digital M&S prototype development/ risk reduction activities and transition to design and development of digital simulation capability, as well as increased effort to design and implement System-level ground test re-architecture improvements.

A. Mission Description and Budget Item Justification

MDA's Modeling and Simulation (M&S) program is essential to ensuring missile defense capabilities are affordable and effective. M&S develops system-level models, frameworks, truth, simulations, and operational environments as missile defense technologies continually advance and the threat changes, and evaluates performance of the Elements, Components, and overall BMD System for verification, validation and accreditation purposes. MDA's M&S program provides a cost effective means to assess and examine the performance space of the BMDS beyond what can be physically tested under current test range conditions and within the Agency's fiscal constraints. M&S future concept simulation activities provide the capability to design and develop technologies to hedge against future missile threats. MDA's M&S systems and products provide analysis and decision-making and planning capabilities for Real-World Operations to inform the National Command Authority, Joint Staff, Military Services, NATO, Combatant Commanders (CCMDs), Operational Test Authority (OTAs), Director of Operational Test & Evaluation (DOT&E), and Allies.

The strategy of MDA's M&S Program is 1) to execute a single, integrated, and synchronized program to manage M&S development and sustainment in support of MDA's BMDS acquisition, 2) to improve BMDS Flight and Ground Test execution, 3) to leverage MDA test activities to collect data to anchor M&S, and 4) to perform warfighter training and tactics validation. The strategy also incorporates key elements to address DOT&E's BMDS Assessment Report: Ensure that future M&S architectures are composable and flexible, and simplify the integration process to conserve resources and improve capabilities; Ensure that future M&S architectures incorporate and require the use of consistent truth representations (phenomenology, lethality, environmental factors, threat simulations, etc.); Improve cross-organizational system engineering processes to optimize requirements generation and ensure the inclusion of all stakeholders; Develop refined M&S accreditation criteria between MDA and the OTA.

MDA's M&S Program consists of system and product planning, development, integration, and operation; threat model development, verification, and analysis; and integration and deployment of MDA's Distributed BMDS real-time Hardware-in-the-Loop (HWIL) and digital M&S simulation capabilities. Models and simulations are tailored to the specific needs of the Agency's test events and to match BMDS components in their various stages of development, ranging from low-to-medium fidelity analyses supporting concept definitions studies, to high-fidelity models used to support engineering level activities. MDA validates and accredits system-level models and simulations by anchoring them to ground and flight test events, per the Integrated Master Test Plan (IMTP), to enable accurate and comprehensive assessments of the BMDS.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD31 / Modeling & Simulation
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018		FY 2019
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Title: M&S Requirements, Design Support, Scenario Optimization	8.285	8.022		12.621
Articles:	-	-		-

Description: This activity provides the integrated program lifecycle planning and requirements definition of all BMDS M&S models and capabilities to enable assessment of BMDS capability deliveries. M&S capability development executes an integrated, synchronized program to manage M&S development in support of BMDS development, testing, and assessment. The following actions are required on a continuing basis to accomplish the M&S lifecycle planning and requirements definition mission:

- Maintain traceability between the M&S Systems Requirements Documents and M&S product development.
- Produce capability documents and specifications for M&S product development to enable BMDS flight and HWIL tests, training events, exercises, wargames, concept evaluation and development engineering.
- Support MDA response to export requests for M&S software and technical data to nations or international organizations.
- Participate in Technical Interchange Meetings and provide support for bilateral agreements with allies and partners.
- Support system engineering capability trades for all BMDS capability deliveries (including BMDS capability deliveries for Phased Adaptive Approach and Homeland Defense).
- Continue the transition to replace the Single Stimulation Framework (SSF) with the Objective Simulation Framework (OSF) to support M&S Intended Uses.
- Provide integrated program lifecycle planning and scheduling of all BMDS M&S models and capabilities to enable assessment of BMDS capability deliveries for Phased Adaptive Approach (PAA) and Homeland Defense.

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:
- SEE ABOVE.

FY 2019 Plans:
-Upgrade the SUIU Fleet to current technical standards, interfaces, components and product line support to meet BMDS stakeholder needs for all BMDS Increments and associated test campaigns
-Update Threat Modeling Tools to meet future threat data needs and event environments
-Ensure Environment and Plume core truth model development, verification, maintenance and sustainment meets requirements
-Incorporate emerging BMDS capabilities to include advanced threats into BMD simulations and ground test events

FY 2018 to FY 2019 Increase/Decrease Statement:
Increase from FY 2018 to FY 2019 reflects M&S updates required to improve BMDS VV&A outcomes to address required OTA accreditation plan for all BMDS Elements. This will provide additional confidence in BMDS performance to the Warfighter.

Title: BMDS Simulations & Tools	12.384	11.593		12.326
Articles:	-	-		-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / <i>BMD Enabling Programs</i>	Project (Number/Name) MD31 / <i>Modeling & Simulation</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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Description: This activity funds the development and sustainment of digital products and the architecture framework, and delivery/maintenance of infrastructure for BMDS performance assessments, Warfighter events, and BMD International Simulation events. The following actions are required on a continuing basis:

Event Integration/Support Operations:

- Provide ground test architecture integration to meet IMTP requirements. Use the BMDS test framework to integrate distributed architectures in support of BMDS capability deployments for EPAA Phase 3.
- Integrate, test, and verify the M&S enterprise supporting BMDS testing, assessment, exercises, and wargaming, including testing infrastructure.
- Integrate, test, functionally qualify, and deliver M&S tools and complex test architectures to provide system test capabilities to support MDA IMTP based test events, wargames, and exercises.
- Continue the transition of real-time digital simulation capability to OSF to support Intended Uses.
- Maintain simulations for Element M&S development laboratories used in the BMDS Integration & Development Lab and Digital M&S Integration Center (DMIC) in Huntsville, AL and in the MDIOC Simulation Center.
- Conduct integration, testing and system-level verification per the digital System Requirements Document (SRD). Operate the testbed to mature the OSF-based digital system simulation.
- Provide Event Integration Support for BMDS component models of PATRIOT weapon system for use in MDA test and validation events.
- Provide HWIL/M&S benchmarking/integration, documentation and coordination. Sustain, integrate and execute ground tests, FAST Events and Exercises/Wargames.
- Provide communications emulation (MTJ, STJ, and Link-16) and network analysis support via the Tactical Communications Environment Segment (TCES) for use in IMTP events, HWIL System Post Flight Reconstructions (SPFRs) and HWIL System Pre Mission Tests (SPMTs).
- Perform operational planning for planned BMDS assessment events.
- Conduct M&S system integration and verification to support M&S system architecture development. Conduct developmental integration testing.

M&S Operations:

- Provide digital representations of BMDS elements/components using MDA's BMD International Simulation (I-SIM) in support of CCMD and International Wargames, conceptual planning, BMD visualizations, BMD training/orientation, M&S demonstrations, and the Warfighter's Modification & Fielding Requirements List (MFRL) for exercises and training.
- Implement I-SIM re-architecture requirements and emerging requirements such as IAMD/Fog of War to adapt to growing distributed event requirements.
- Maintain the Missile Defense Space Warning Tool (MDST) to keep pace with fielded BMDS Overhead Persistent Infrared (OPIR) Architectures in support of Warfighter training events, BMDS exercise events, and BMDS development engineering.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs		Project (Number/Name) MD31 / Modeling & Simulation
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Provide software operations/maintenance support to the Extended Air Defense Simulation (EADSIM) code base for use in Warfighter exercises, training venues, and CCMD planning tools.</p> <p>- Upgrade legacy models and develop new designs or software as required to support BMDS simulation Re-Architecture.</p> <p>- Provide threat representations (kinematic trajectories, radar cross sections, and infrared signatures data) for use in real-world events, simulations, exercises, wargames, and test and evaluation activities across the DoD.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <p>- Provide Integrated Threat Packages of red-force representations (kinematic trajectories, radar cross sections, and infrared signature data) for use in BMDS Ground Test events only.</p> <p>- Begin transition off of Discrete Event Simulation (DESIM).</p> <p>FY 2019 Plans:</p> <p>- SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p> <p>N/A</p>				
<p>Title: M&S Objective Simulation Framework (OSF)</p> <p>Description: The following actions are required on a continuing basis to accomplish the OSF mission:</p> <p>- Develop and implement OSF upgrades to incorporate advanced tracking, discrimination, engagement and associated upper tier debris mitigation capabilities, as well as other requirements and capabilities to meet MDA's evolving M&S Enterprise needs.</p> <p>- Sustain and enhance framework products to maintain capabilities to support stakeholders.</p> <p>- Develop plans, procedures and documentation for scheduled events including Wargames and Combatant Command Exercises and the Distributed, Focused and Integrated HWIL Events as presented in the IMTP. Provide event architecture integration and checkout of Wargames for these same IMTP scheduled events.</p> <p>- Provide the ground test architecture integration expertise to meet the testing requirements of the IMTP. Support delivery of integrated architectures for test across all test venues using the BMDS test framework to integrate distributed architectures in support of BMDS.</p> <p>- Develop, maintain, test, field, and operate model representations for use in events and other MDA M&S stakeholder application areas. Deploy hardware and software updates to distributed sites. Perform regular maintenance and critical repairs of hardware and software.</p> <p>- Develop a BMDS-level integrated, high-fidelity end-to-end digital simulation, including hardware and software, data storage and transmission, and verification tools.</p>		14.592	14.049	14.680
		Articles:	-	-
				-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD31 / Modeling & Simulation		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Maintain the M&S Integration and Development Laboratories for Element M&S. Maintain venue for stakeholders to conduct early integration efforts and identification of issues prior to event architecture integration to support system development.</p> <p>- Deploy System Interface Units (SIUs) for BMDS testing - materials, licenses, SIU fleet purchasing. Deploy SIUs and components to maintain and sustain SIU fleet including cybersecurity; enables Developmental and Operational testing with full BMDS as required in IMTP.</p> <p>- Continue maintenance of SSF in the required venues until the transition to OSF in the venues completes.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
Title: M&S Core Truth Modeling		11.252	10.840	12.373
		Articles: -	-	-
<p>Description: The Core Truth Model (CTM) program provides consistent and common Phenomenology, Lethality, Environment, Communications, and Threat models for BMDS M&S venues utilized in all Digital and Ground Test Events and Wargaming Exercises. The CTM efforts are critical in the assessment of all BMDS capability deliveries. The following actions are required on a continuing basis to accomplish the CTM mission:</p> <ul style="list-style-type: none"> - Implement next generation truth representations for signatures and lethality to address advanced BMDS capability needs for tracking, discrimination and engagement - Maintain legacy truth representations (e.g., Parametric Endoatmospheric-Exoatmospheric Lethality Simulation (PEELS), Kinetic Intercept Debris Distribution (KIDD) and Optical Signatures Code/Optical Signature Inline Generator (OSC/OPTISIG)) until fully transitioned. - Support integration of all applicable CTM functions into the OSF framework. - Provided support for scheduled events including training, exercises, Wargames, and the Distributed, Focused and Integrated HWIL Events as presented in the IMTP. - Deliver CTM Toolkit for integrated truth representations across the M&S enterprise. - Continue re-establishment of the Environments Program that will provide consistent environment models for system and element level simulations. - Continue development of Truth Interaction which includes infrared (IR) propagation and radio frequency (RF) propagation,. This will provide consistent models and truth to system and element level simulations. 				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs		Project (Number/Name) MD31 / Modeling & Simulation
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Generate CTM Sensitivity analysis to identify the sensitivity within system simulation of Core Truth Models and boundary. - Develop and maintain CTM design to support system and element level simulations. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - Update Threat Modeling Tools to meet evolving threat data needs and event environments - Ensure Environment and Plume core truth model development, verification, maintenance and sustainment meets requirements</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects M&S updates required to improve BMDS VV&A outcomes to address required OTA accreditation plan for all BMDS Elements. This will provide additional confidence in BMDS performance to the Warfighter.</p>				
<p>Title: M&S Improvements</p> <p align="right">Articles:</p> <p>Description: This effort funds BMDS Enterprise-wide M&S improvements that will enhance digital and ground test capabilities. Planned improvements include an experimental, developmental M&S prototype capability necessary to achieve a BMDS-level integrated, high-fidelity end-to-end digital simulation. The prototype effort designs and develops a digital simulation capability that will provide assessment data for the BMDS, supplemental to Ground- and Flight tests, and in areas that those venues cannot address, with statistically significant numbers of runs. The end-to-end digital simulation will eventually replace the current stand-alone approach to digital predictive pre-mission analysis. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: This effort is a follow-on to planning and design efforts begun in FY 2016-2017. FY 2018 increase is due to additional MDA focus on improvement of M&S digital capability to support Technical Capability Declarations. - Design and develop prototype, including hardware for development and execution platforms, of enterprise-wide digital interface and new functionality in time-management and modeling of simulated BMDS communications, based on FY 2017 government/CSS design work.</p> <p>FY 2019 Plans: - Develop M&S infrastructure needed to modify Element-level models to meet System-level requirements - Continue the development of initial digital capability for first use supporting BMDS Increment 6b in FY 2021 Timeframe -- Conduct Systems Engineering Design Reviews -- Implement software development for initial Digital M&S components</p>		0.000 -	5.320 -	37.786 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD31 / Modeling & Simulation
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
-- Incorporate required M&S IT hardware infrastructure to enable statistically significant runs for Increment 6b FY21 assessment - Design and develop full BMDS-level high-fidelity digital capability: -- Conduct System Requirements Review (SRR) -- Build towards full Digital BMDS M&S architecture - Perform top-down systems engineering and software development to implement BMD System-level ground test improvements: -- Develop a ground test system design to align with the tactical BMDS for new and more complex systems and implement system-wide M&S improvements in truth data consistency, framework interfaces, consistent data formats and reduce integration timelines -- Implement Ground Test enterprise-wide re-architecture, to address Ground Test capability gaps and limitations that have hindered M&S FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects completion of BMDS-level Digital M&S prototype development/risk reduction activities and transition to design and development of digital simulation capability, as well as major increased effort to design and implement System-level ground test re-architecture improvements.			
Accomplishments/Planned Programs Subtotals	46.513	49.824	89.786

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603881C: Ballistic Missile	197.171	292.262	214.173	-	214.173	199.399	197.451	174.161	152.174	Continuing	Continuing
<i>Defense Terminal Defense Segment</i>											
• 0603882C: Ballistic Missile Defense Midcourse Defense Segment	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603892C: AEGIS BMD	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing

Remarks

D. Acquisition Strategy

The M&S acquisition strategy utilizes full and open competition to develop, acquire and deliver the integrated architectures/frameworks while the Elements, using the same open competition methods, develop and deliver models of their systems. The Digital and HWIL product centers integrate the suite of M&S into a composite simulation capability, all based on an open architecture. M&S achieves this end-state via close collaboration between its integrating contractor teams (Digital and HWIL) and those of the Element prime contractors, with additional technical standards and engineering oversight provided by FFRDCs and UARCs.

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / <i>BMD Enabling Programs</i>	Project (Number/Name) MD31 / <i>Modeling & Simulation</i>
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E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD31 / Modeling & Simulation
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
M&S Requirements, Design Support, Scenario Optimization - 3rd generation SIU development	C/CPFF	TBE : AL	0.000	0.000		0.000		4.500	Nov 2018	-		4.500	Continuing	Continuing	Continuing
M&S Requirements, Design Support, Scenario Optimization - FFRDC & UARC	MIPR	Various : CO, AL	2.864	1.728	Nov 2016	1.632	Nov 2017	1.781	Nov 2018	-		1.781	Continuing	Continuing	Continuing
M&S Requirements, Design Support, Scenario Optimization - Prior Yr Requirements & Scenario Design no longer funded in FYDP	Various	Various : AL	1.933	0.000		0.000		0.000		-		0.000	0.000	1.933	0.000
M&S Requirements, Design Support, Scenario Optimization - Requirements & Design - CSS 2	C/CPFF	MiDAESS / TEAMS : CO	10.387	5.400	Nov 2016	6.390	Nov 2017	6.340	Nov 2018	-		6.340	Continuing	Continuing	Continuing
M&S Requirements, Design Support, Scenario Optimization - Requirements & Design - OGA	MIPR	SMDC : AL	0.932	0.482	Nov 2016	0.000		0.000		-		0.000	0.000	1.414	0.000
M&S Requirements, Design Support, Scenario Optimization - Requirements & Design Support	Various	MDA : CO, AL	4.510	0.675		0.000		0.000		-		0.000	0.000	5.185	0.000
BMDS Simulations & Tools - Digital Framework Development	C/CPAF	Northrop Grumman : CO	15.162	5.729	Nov 2016	6.884	Nov 2017	7.007	Nov 2018	-		7.007	Continuing	Continuing	Continuing
BMDS Simulations & Tools - Digital Simulation Development / Support	MIPR	SMDC : AL	3.547	0.000		0.000		0.000		-		0.000	0.000	3.547	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD31 / Modeling & Simulation
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
BMDS Simulations & Tools - M&S / Digital Framework Support	Various	MDA : CO, AL	1.665	0.895	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
BMDS Simulations & Tools - M&S / Digital Framework Support - CSS	C/CPFF	MiDAESS / TEAMS : CO	0.000	1.539	Nov 2016	1.300	Nov 2017	1.339	Nov 2018	-		1.339	Continuing	Continuing	Continuing
BMDS Simulations & Tools - M&S / Digital Framework Support - Industry	C/CPFF	TBE : AL	0.000	0.959	Nov 2016	0.891	Nov 2017	0.834	Nov 2018	-		0.834	Continuing	Continuing	Continuing
BMDS Simulations & Tools - M&S / Digital Framework Support - OGA	MIPR	AMRDEC : AL	10.679	3.262	Nov 2016	2.518	Nov 2017	3.146	Nov 2018	-		3.146	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL - CSS	C/CPFF	MiDAESS / TEAMS : CO	0.000	2.200	Nov 2016	0.800	Nov 2017	1.016	Nov 2018	-		1.016	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL - Industry	C/CPAF	Northrop Grumman : CO	5.570	0.620	Nov 2016	0.350	Nov 2017	0.350	Nov 2018	-		0.350	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL Framework Development and Support	C/CPFF	MASC : AL, CO	15.645	4.593	Nov 2016	9.434	Nov 2017	9.849	Nov 2018	-		9.849	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL Simulations / Models Development	MIPR	AMRDEC : AL	19.198	3.867	Nov 2016	0.550	Nov 2017	0.550	Nov 2018	-		0.550	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL Support / GT re-architecture	Various	MDA : AL, CO	3.069	3.312	Nov 2016	2.915	Nov 2017	2.915	Nov 2018	-		2.915	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth Modeling - OGA	MIPR	AFRL : CO	0.000	1.300	Nov 2016	1.400	Nov 2017	1.400	Nov 2018	-		1.400	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD31 / Modeling & Simulation
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
M&S Core Truth Modeling - Core Truth Models Validation	Various	MDA : CO, AL	5.644	0.500	Oct 2016	1.000	Nov 2017	0.800	Nov 2018	-		0.800	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth Modeling - CSS	C/CPFF	Peopletec : AL, CO	0.000	0.916	Nov 2016	1.591	Nov 2017	1.990	Nov 2018	-		1.990	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth Modeling - CSS 2	C/CPFF	TEAMS : AL, CO	0.000	0.000		0.000		1.683	Nov 2018	-		1.683	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth Modeling - Lethality/ Phenomenology Modeling	MIPR	AMRDEC : AL	30.002	2.400	Nov 2016	1.310		1.110	Nov 2018	-		1.110	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth Modeling Simulation System	C/CPAF	Northrop Grumman : CO	34.597	6.136	Nov 2016	5.539	Nov 2017	5.390	Nov 2018	-		5.390	Continuing	Continuing	Continuing
M&S Improvements - Enterprise-wide ground test re-architecture improvements	Various	Various : CO, AL	0.000	0.000		0.000		18.000	Dec 2018	-		18.000	Continuing	Continuing	Continuing
M&S Improvements - M&S Improvement - Enterprise-wide digital capability development	Various	Various : CO, AL	0.000	0.000		5.320	Dec 2017	19.786	Nov 2018	-		19.786	Continuing	Continuing	Continuing
Subtotal			165.404	46.513		49.824		89.786		-		89.786	Continuing	Continuing	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD31 / Modeling & Simulation
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks

N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	165.404	46.513	49.824	89.786	-	89.786	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD31 / Modeling & Simulation
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	Significant Event Complete ▲			Milestone Decision Complete ★			Element Test Complete ◆			System Level Test Complete ●			Complete Activity ◆								
	Significant Event Planned △			Milestone Decision Planned ☆			Element Test Planned ◇			System Level Test Planned ○			Planned Activity ◇								
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
Release Update to OSF - FY 2018						△															
MDST v16.3						△															
International Simulation v8.5						△															
FTG-11 HWIL System Pre-Mission Test (SPMT)									△												
FTG-11 Count Down Exercise												△									
International Simulation v8.6															△						
Release Update to OSF - FY 2019																		△			
International Simulation v8.7																					△
GTX-08 Part 2																					△
Release Update to OSF - 2Q FY 2020																					△
Release Update to OSF - FY 2021																					△
International Simulation v8.8 - 1Q-FY 2021																					△
GTX-09																					△
Release Update to OSF - FY 2022																					△
International Simulation v8.9 - 1Q FY 2022																					△
International Simulation v8.10 - 1Q FY 2023																					△
Release Update to OSF - FY 2023																					△

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD31 / Modeling & Simulation
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Release Update to OSF - FY 2018	1	2018	1	2018
MDST v16.3	1	2018	1	2018
International Simulation v8.5	1	2018	1	2018
FTG-11 HWIL System Pre-Mission Test (SPMT)	2	2018	2	2018
FTG-11 Count Down Exercise	4	2018	4	2018
International Simulation v8.6	1	2019	1	2019
Release Update to OSF - FY 2019	1	2019	1	2019
International Simulation v8.7	1	2020	1	2020
GTX-08 Part 2	1	2020	1	2020
Release Update to OSF - 2Q FY 2020	2	2020	2	2020
Release Update to OSF - FY 2021	1	2021	1	2021
International Simulation v8.8 - 1Q-FY 2021	1	2021	1	2021
GTX-09	4	2021	4	2021
Release Update to OSF - FY 2022	1	2022	1	2022
International Simulation v8.9 - 1Q FY 2022	1	2022	1	2022
International Simulation v8.10 - 1Q FY 2023	1	2023	1	2023
Release Update to OSF - FY 2023	1	2023	1	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC31 / Engineering Cyber Operations
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC31: <i>Engineering Cyber Operations</i>	0.817	2.980	3.838	4.466	-	4.466	11.564	34.665	10.697	13.383	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

This project supports the monitoring and tracking of Cybersecurity mitigations detailed in Information Technology security POAMs. Activities include preparation of certification and accreditation documentation and accreditation recommendations to the MDA Senior Information Assurance Officer (SIAO)/Certification Authority (CA) and DAA. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act.

This project implements Risk Management Framework (RMF) system engineering principles as specified within DOD 8510.01 to acquire, design, test, implement and field technical solutions throughout the systems architecture to ensure sufficient protections exist from a threat and risk based approach. MDA's goal is to ensure Cybersecurity engineering principles flow into system requirements and design specifications early to provide the most cost benefit and ensure security controls are aligned with the National Institute of Standards and Technology (NIST) 800-53a security controls as applicable to systems categorized as National Security Systems.

This project includes funding to conduct an MDA Insider threat program to identify, deter, and mitigate potential insider threats. This activity is Presidentially and DoD-mandated.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Information Assurance / Cyber Network Defense	2.980	3.838	4.466
Articles:	-	-	-
Description: This activity funds network defense and Information System Security Manager (ISSM) activities for MDA Engineering. Specific tasks include:			
- Conduct Cybersecurity/information assurance engineering and architecture planning for Engineering information technology systems.			
- Plan and test the information assurance controls for Engineering systems.			
- Implement RMF system engineering principles to ensure sufficient protections exist from a threat and risk based approach			
- Conduct Controls Validation Testing of systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC31 / Engineering Cyber Operations
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>- Conduct annual information assurance reviews to assess compliance in implementing and maintaining information assurance controls.</p> <p>- Perform cybersecurity upgrades as needed to MDA Engineering systems to be in compliance with DoD mandates.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: FY 2018 increase is to fund additional cybersecurity support needed to ensure BMDS networks and MDA Engineering content on external networks is protected, and to monitor those networks in accordance with DoD mandates. Also beginning in FY 2018, funding for MDA Insider Threat mitigation has been transferred to this project from project MD28, Intelligence and Security.</p> <p>- Augment Insider Threat mitigation capabilities, including enhancements for defense of IT systems.</p> <p>- Complete upgrades to MDA Engineering networks, including the Threat Modeling Center network and the BMDS I-SIM development network.</p> <p>FY 2019 Plans: - Continue development and implementation of Software Assurance policies, processes, and guidelines.</p> <p>- Augment Cyber Assistance Teams to conduct assessments of MDA Defense Industrial Base partners' ability to safeguard MDA information.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects requirements to address statutory requirements for Cybersecurity and Software Assurance.</p>			
Accomplishments/Planned Programs Subtotals	2.980	3.838	4.466

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0305103C: Cyber Security Initiative	0.945	0.986	0.985	-	0.985	1.140	1.163	1.187	1.209	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC31 / Engineering Cyber Operations
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Information Assurance / Cyber Network Defense - Cybersecurity Upgrades	C/CPAF	Northrop Grumman : CO	0.000	1.250	Jan 2017	1.150	Dec 2017	0.510	Dec 2018	-		0.510	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - IT / Cybersecurity Support	C/CPFF	MiDAESS / TEAMS : CO, AL, VA	0.817	0.886	Nov 2016	1.559	Nov 2017	1.194	Nov 2018	-		1.194	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Insider Threat Mitigation Cell IT Network Defense	Various	MDA : Various	0.000	0.500	Dec 2016	1.129	Dec 2017	0.862	Dec 2018	-		0.862	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Software Assurance	Various	MDA : Various	0.000	0.344	Dec 2016	0.000		1.900	Nov 2018	-		1.900	Continuing	Continuing	Continuing
Subtotal			0.817	2.980		3.838		4.466		-		4.466	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.817	2.980	3.838	4.466	-	4.466	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MC31 / Engineering Cyber Operations
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;"></th> <th style="width: 10%;">FY 2017</th> <th style="width: 10%;">FY 2018</th> <th style="width: 10%;">FY 2019</th> <th style="width: 10%;">FY 2020</th> <th style="width: 10%;">FY 2021</th> <th style="width: 10%;">FY 2022</th> <th style="width: 10%;">FY 2023</th> </tr> </thead> <tbody> <tr> <td>MC31 M&S Cyber Operations</td> <td></td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> </tr> </tbody> </table>						FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	MC31 M&S Cyber Operations		◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MC31 M&S Cyber Operations		◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / <i>BMD Enabling Programs</i>	Project (Number/Name) MC31 / <i>Engineering Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC31 M&S Cyber Operations	1	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs				Project (Number/Name) MD32 / Quality, Safety, and Mission Assurance			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD32: <i>Quality, Safety, and Mission Assurance</i>	206.246	29.813	30.516	29.319	-	29.319	31.135	30.766	31.398	32.286	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Quality, Safety, and Mission Assurance verifies that all systems are functioning and tracking against actual verified targets and that all associated processes and procedures are strictly followed.

Quality: Provides on-site Quality Assurance (QA) inspection for all ground and flight tests to ensure that all processes and procedures are adhered to and no short cuts or deviations occur. Quality management system audits are performed on the sub tier supply chain to determine adequacy of contractor requirement flow down and sub tier supplier compliance to industry standards. Quality Subject Matter Experts (SMEs) attend BMDS configuration control boards to ensure quality is implemented across all Programs. Provides quality on-site formal inspection and resolution when troubled suppliers are identified and also initiates and leads on-site Joint Government and Industry Team field support and expertise to assist when critical sole source suppliers are failing. Conducts initiatives to revamp sole source suppliers by assisting them to get healthy and perform at world class levels, establishes consistent acquisition and award fee contractual requirements to ensure that a strategic approach is applied to all mission critical systems and maintains MDA Assurance Provisions for the Agency.

Safety: Responsible for system safety of the BMDS and for the Safety and Occupational Health of personnel located in the National Capital Region (NCR); Huntsville, Alabama; Fort Greely, Alaska; Vandenberg Air Force Base (VAFB), California; and, Dahlgren, VA. Additionally responsible for ensuring the overall safety of the civilian, contractor and military workforce. BMDS Safety Officers (BSOs) provide on-site support 24 hours a day, 365 days a year to ensure operational safety of systems.

Mission Assurance: Provides in-plant MDA Assurance Representatives (MARs) for the MDA at government and contractor facilities. MARs are Government Mission Assurance and Quality experts who provide quality and technical oversight of contractor manufacturing. Mission Assurance Audits are conducted which focus on design margin, the effectiveness of acceptance testing and the sufficiency of manufacturing processes. Audits are performed for contractual requirements, internal requirements, and industry best practices. These audits are one of MDA's most effective methods of enabling change among the MDA contractors and suppliers. Quality, Safety, and Assurance provides Subject Matter Experts (SMEs) who attend all technical reviews (i.e. Design, Test, Mission Readiness Reviews, and Failure Review Boards) to ensure mission assurance principles are consistently implemented across the Ballistic Missile Defense System (BMDS). Quality, Safety, and Mission Assurance develops overarching design and quality standards such as the MDA Assurance Provisions (MAP) for MDA which enhances BMDS reliability. Hardware acceptance reviews and pedigree documentation reviews are performed to ensure all manufacturing rework and repair is performed within approved processes.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD32 / Quality, Safety, and Mission Assurance

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Title: Quality, Safety & Mission Assurance</p> <p align="right">Articles:</p> <p>Description: Quality, Safety, and Mission Assurance verifies that all systems are functioning and tracking against actual verified targets and that all associated processes and procedures are strictly followed.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>	29.813	30.516	29.319
Accomplishments/Planned Programs Subtotals	29.813	30.516	29.319

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Quality, Safety and Mission Assurance program is a collaboration between subject matter expertise in the Government, Federally Funded Research and Development Centers (FFRDC), University Affiliated Research Centers (UARC), Contract Support Services (CSS), and Industry.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD32 / Quality, Safety, and Mission Assurance
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Quality, Safety & Mission Assurance - Agency Safety & Occupational Health	C/CPFF	Various Multi : AL, CO, AK, DC	2.327	0.227	Dec 2016	0.260	Dec 2017	0.273	Nov 2018	-		0.273	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Audits & Quality On-site Support	MIPR	NSWC Corona : AL, CA	19.839	2.417	Dec 2016	3.316	Dec 2017	3.305	Nov 2018	-		3.305	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - BMDS Mission Assurance Agency Operations	C/CPFF	AI Solutions : AL	7.745	1.009	Dec 2016	1.100	Dec 2017	0.714	Nov 2018	-		0.714	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - BMDS Quality Support	C/CPFF	AI Solutions : AL	7.897	1.710	Dec 2016	1.500	Dec 2017	0.762	Nov 2018	-		0.762	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - BMDS Safety	C/CPFF	APT, INC : AL	9.628	1.208	Dec 2016	1.200	Dec 2017	1.191	Nov 2018	-		1.191	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - BMDS Safety Officers	MIPR	AMRDEC : AL	4.016	0.281	Dec 2016	0.300	Dec 2017	0.101	Nov 2018	-		0.101	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - HQ & Core Management	MIPR	AMRDEC : AL	2.450	0.300	Dec 2016	0.275	Dec 2017	0.221	Nov 2018	-		0.221	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - In-Plant Quality Support (MARS)	C/CPFF	Various Multi : AL, AK, AZ, CA, CO, FL,	11.426	1.413	Dec 2016	1.415	Dec 2017	1.417	Nov 2018	-		1.417	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD32 / Quality, Safety, and Mission Assurance
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		HI, NJ, MA, MO, MD, UT													
Quality, Safety & Mission Assurance - Independent Readiness Review Team	C/CPFF	AI Solutions : AL	4.809	0.550	Dec 2016	0.540	Dec 2017	0.191	Nov 2018	-		0.191	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Mission Assurance Subject Matter Experts	C/CPFF	APT, INC. : AL	7.112	0.531	Dec 2016	0.520	Dec 2017	0.476	Nov 2018	-		0.476	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Operations Support	MIPR	Various Multi : AL, CA	4.809	0.200	Dec 2016	0.200	Dec 2017	0.200	Nov 2018	-		0.200	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Parts, Materials and Processes (PMP) Program	MIPR	Various Multi : AL, CA, IN	12.020	2.015	Dec 2016	1.961	Dec 2017	2.727	Nov 2018	-		2.727	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Parts, Materials and Processes - PMP - Program	C/CPFF	APT, INC : AL	4.086	0.600	Dec 2016	0.600	Dec 2017	0.700	Nov 2018	-		0.700	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Pedigree & Design Certification - FFRDC	MIPR	Aerospace : AL, CA	21.067	2.902	Dec 2016	3.000	Dec 2017	2.752	Nov 2018	-		2.752	Continuing	Continuing	Continuing
Subtotal			119.231	15.363		16.187		15.030		-		15.030	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD32 / Quality, Safety, and Mission Assurance
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Quality, Safety & Mission Assurance - Quality, Safety & Mission Assurance HQ & Core Management (MDA CIV)	Allot	MDA QS : AL, VA, MD, CA, AZ, HI, AK, MA, NJ, FL, AR, UT	63.866	11.813	Oct 2016	11.794	Oct 2017	11.822	Oct 2018	-		11.822	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Quality, Safety & Mission Assurance Operations Support	C/CPPF	MDA QS : AL, DC, VA	8.533	1.527	Nov 2016	1.345	Nov 2017	1.467	Nov 2018	-		1.467	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Quality, Safety & Mission Assurance Operations Support (Travel/PCS)	Allot	MDA QS : AL, CO, AK, DC, VA	14.616	1.110	Nov 2016	1.190	Nov 2017	1.000	Nov 2018	-		1.000	Continuing	Continuing	Continuing
Subtotal			87.015	14.450		14.329		14.289		-		14.289	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	206.246	29.813	30.516	29.319	-	29.319	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency							Date: February 2018		
Appropriation/Budget Activity 0400 / 4			R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs			Project (Number/Name) MD32 / Quality, Safety, and Mission Assurance			

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
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Remarks
 Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency						Date: February 2018													
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs						Project (Number/Name) MD32 / Quality, Safety, and Mission Assurance							
Significant Event Complete ▲		Milestone Decision Complete ★		Element Test Complete ◆		System Level Test Complete ●		Complete Activity ◆		Significant Event Planned △		Milestone Decision Planned ☆		Element Test Planned ◇		System Level Test Planned ○		Planned Activity ◇	
						FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023	
MD32 Quality, Safety, and Mission Assurance						◇◇◇◇		◇◇◇◇		◇◇◇◇		◇◇◇◇		◇◇◇◇		◇◇◇◇			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD32 / Quality, Safety, and Mission Assurance

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD32 Quality, Safety, and Mission Assurance	1	2017	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs				Project (Number/Name) MD40 / Program-Wide Support			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	124.578	15.006	21.474	20.550	-	20.550	23.237	27.493	22.427	22.585	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) reflects proportional changes as a result of budget changes in BMD Enabling Program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA-wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	15.006	21.474	20.550
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	15.006	21.474	20.550

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / <i>BMD Enabling Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD40 / Program-Wide Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various Multi: AL, CO, CA, VA etc.	14.604	5.293	Jan 2017	4.299	Jan 2018	3.635	Mar 2019	-		3.635	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various: Multi: AL, CA, CO, VA	5.416	0.000		0.429	Jul 2018	0.311	Jul 2019	-		0.311	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	C/CPAF	Various: Multi: AL, CO, NM, VA, various	5.602	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	MDA: AK, AL, CA, CO, VA	32.108	0.000		0.000		0.000		-		0.000	32.378	64.486	0.000
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various: Multi: AL, CO, CA, VA	66.043	9.713	Nov 2016	16.746	Nov 2017	16.604	Apr 2019	-		16.604	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various: Multi: AK, AL, CA, CO, VA	0.805	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services MIPRs	MIPR	Various: Multi: AK, AL, CO, CA, HI, MD, VA, NJ, NY, OCONUS	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - FFRDC	C/CPFF	JHU: CA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance SRM	MIPR	Various: Multi: AL, CA, AL, AK	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			124.578	15.006		21.474		20.550		-		20.550	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD40 / Program-Wide Support
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	124.578	15.006	21.474	20.550	-	20.550	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD40 / Program-Wide Support
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 10%;">FY 2017</th> <th style="width: 10%;">FY 2018</th> <th style="width: 10%;">FY 2019</th> <th style="width: 10%;">FY 2020</th> <th style="width: 10%;">FY 2021</th> <th style="width: 10%;">FY 2022</th> <th style="width: 10%;">FY 2023</th> </tr> </thead> <tbody> <tr> <td>MD40 Program-Wide Support</td> <td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td> </tr> </tbody> </table>						FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603890C / BMD Enabling Programs	Project (Number/Name) MD40 / Program-Wide Support
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603891C / <i>Special Programs - MDA</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,480.542	289.364	365.190	422.348	-	422.348	406.779	405.289	425.469	403.884	Continuing	Continuing
MD27: <i>Special Programs</i>	1,480.542	289.364	365.190	422.348	-	422.348	406.779	405.289	425.469	403.884	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$2.0 million was required to address emergency warfighting requirements in support of Special Programs. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$45.0 million is required to address emergency warfighting requirements in support of Special Programs. Additional details are available at a higher classification level.

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

B. Program Change Summary (\$ in Millions)

	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>
Previous President's Budget	323.607	320.190	273.713	-	273.713
Current President's Budget	289.364	365.190	422.348	-	422.348
Total Adjustments	-34.243	45.000	148.635	-	148.635
• Congressional General Reductions	-16.930	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-9.921	0.000			
• SBIR/STTR Transfer	-7.392	0.000			
• FY 2017 Request for Additional Appropriations	-2.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	2.000	45.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	148.635	-	148.635

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 4: <i>Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603891C / <i>Special Programs - MDA</i>
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Change Summary Explanation

Further details are reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$2.0 million was required to address emergency warfighting requirements in support of Special Programs. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$45.0 million is required to address emergency warfighting requirements in support of Special Programs. Additional details are available at a higher classification level.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603892C / <i>AEGIS BMD</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	4,608.032	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
MD09: <i>Aegis BMD</i>	4,257.845	771.211	292.063	253.686	-	253.686	392.027	392.393	356.791	309.348	Continuing	Continuing
MG09: <i>Aegis BMD SM-3 Development Articles</i>	-	0.000	253.276	120.217	-	120.217	0.000	0.000	0.000	0.000	0.000	373.493
MM09: <i>Aegis BMD SM-3 Development</i>	-	0.000	98.150	161.958	-	161.958	158.636	87.272	101.329	17.317	0.000	624.662
MC09: <i>Cyber Operations</i>	2.925	2.301	2.340	10.886	-	10.886	13.718	16.238	10.274	11.164	Continuing	Continuing
MX09: <i>Aegis BMD Development Support</i>	115.328	74.920	173.325	185.742	-	185.742	182.219	183.780	194.068	194.217	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	231.934	41.057	41.634	35.050	-	35.050	33.485	28.218	30.794	30.702	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2018 to FY 2019 reflects SM-3 Block IIA incremental funding levels synchronized to support manufacturing expenditure profile for seventeen FY16 contracted SM-3 Block IIA AURs.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENT (MDDE) BUDGET AMENDMENT: +\$8.736 million is required to address emergency warfighting requirements in support of USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test.

A. Mission Description and Budget Item Justification

The Aegis BMD mission is to deliver an enduring, operationally effective and supportable BMD capability to defend the nation, deployed forces, friends and allies, and to increase this capability by delivering evolutionary improvements as part of Ballistic Missile Defense System (BMDS) upgrades. The Aegis BMD element of the BMDS capitalizes upon and evolves from the existing United States Navy Aegis Weapons System (AWS) and Standard Missile (SM) infrastructures. Aegis BMD provides a forward-deployable, mobile capability to detect and track Ballistic Missiles of all ranges, and the ability to destroy Short-Range Ballistic Missiles (SRBMs), Medium-Range Ballistic Missiles (MRBMs), and Intermediate-Range Ballistic Missiles (IRBMs) in the midcourse phase of flight, and shorter range missiles in the terminal phase of flight. Aegis BMD also provides a Long Range Surveillance and Track (LRS&T) capability to the BMDS. Upgrades to both the Aegis BMD Weapon System and the Standard Missile-3 (SM-3) configuration enable Aegis BMD to provide effective, supportable defensive capability against longer range, more sophisticated threats and an enduring Aegis Ashore defensive capability.

This Program Element includes BMDS threat discrimination improvements, which will enhance BMDS effectiveness against the evolving adversary threat. The result will be a BMDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD
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more efficiently using interceptor inventory. BMDs threat discrimination improvements are funded from the Enabling (0603890C), Midcourse (0603882C), BMD Sensors (0603884C), C2BMC (0603896C), and Aegis BMD (0603892C) PEs.

This Program Element also investigates concepts and performs systems engineering to address hypersonic threats.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	959.066	852.052	805.051	-	805.051
Current President's Budget	889.489	860.788	767.539	-	767.539
Total Adjustments	-69.577	8.736	-37.512	-	-37.512
• Congressional General Reductions	-40.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-10.000	0.000			
• SBIR/STTR Transfer	-19.577	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	8.736	0.000	-	0.000
• Other Adjustment	0.000	0.000	-37.512	-	-37.512

Change Summary Explanation

Decrease from FY 2018 to FY 2019 is reflects the completion of FY16 SM-3 Block IIA RDT&E All Up Rounds (AURs) purchase and of Aegis Ballistic Missile Defense(BMD) 5.0x Development and Navy certification of the baseline and related development efforts.

FY 2018 MISSILE DEFEAT AND DEFENSE ENCHANCEMENT (MDDE) BUDGET AMENDMENT: +\$8.736 million is required to address emergency warfighting requirements in support of USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD				Project (Number/Name) MD09 / Aegis BMD			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD09: <i>Aegis BMD</i>	4,257.845	771.211	292.063	253.686	-	253.686	392.027	392.393	356.791	309.348	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Aegis BMD continues development of a Sea-Based BMD capability in support of the MDA's mission to protect the homeland, deployed forces, friends and allies from ballistic missile threats of all ranges and in all stages of flight.

Aegis BMD 4.1 capability builds upon legacy Aegis BMD 4.0 and captured all the threats built into Aegis BMD 5.0 CU. It includes an increased BMD threat set, and provides increased maximum engagements and maximum missiles-in-flight over BMD 4.0.

Aegis BMD 5.1 builds upon Aegis BMD 5.0 CU (COTS based open architecture) and further expands the threat set to include threats which are required for EPAA Phase III. This includes the integration of the SM-3 Block IIA, introduction of an Engage on Remote (EoR) capability, and improved BMDS interoperability and engagement coordination.

Aegis BL 5.4 (BMD 4.1) merges the BMD 4.1 capability with the U. S. Navy (USN) Aegis Baseline 5.3 into a single integrated computer program with planned U.S. Navy Certification in FY 2019. Twenty-one legacy Aegis Flight I/II Destroyers, not planned for Aegis Modernization (AMOD), possess two separate certified computer programs: Aegis BMD 4.0 for Ballistic Missile Defense missions and Aegis Baseline 5.3 for Anti-Air Warfare (AAW), Surface Warfare (SUW), and Undersea Warfare (USW). The Aegis BL 5.4 (BMD 4.1) computer program integrates Aegis Baseline 5.3 and Aegis BMD 4.0 to remedy the need for the warfighter to use both simultaneously.

An additional benefit of the single integrated computer program is enabling future SPY-1 Low Noise Amplifier (LNA) Refurbishment efforts to be added during the ship's Service Life

Following Aegis BL 5.4, the Aegis BL 5.4.X (BMD 4.2) AN/SPY-1 upgrade with the U.S. Navy will provide refurbishment of existing ship AN/SPY-1 radar arrays with the installation of antenna Low Noise Amplifiers (LNAs) (MDA funding beginning in FY 2019). These refurbished and upgraded antennas, when integrated with Aegis BL 5.4.X (BMD 4.2), will increase BMD capabilities with improved sensitivity, discrimination, and more efficient radar resource utilization.

Aegis BMD 6.0 provides an increased BMD capability by incorporating the Air and Missile Defense Radar (AMDR), now designated SPY-6, for introduction on the first DDG Flight III. Aegis BMD 6.0 will enable BMDS element utilization of AMDR data for remote engagement and supplement deployed assets with simultaneous multi-mission capabilities (e.g. Integrated Air and Missile Defense (IAMD)). It will include IAMD planning; search, track, and discrimination. SPY-6 will support force level (multi-asset) approach to raid defense and enable U.S. Navy ships greater stand-off range from threat environments.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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Weapon System Capability Insertion will capture Aegis BMD capability upgrades to modernized U.S. Navy Destroyers (FLT II, IIA and III). Future capability developments beyond Aegis BMD 6.0 will incrementally continue to provide increased BMD capability with the SPY-1 and SPY-6 radars. These will include further updates for advanced threats, advanced mission planning, search, track, discrimination improvements; and kill assessment updates. SPY-6 will support force-level (multi-asset) approach to raid defense and will enable U.S. Navy ships to have a greater stand-off range from threat environments. These future capabilities will serve as the path forward to achieve BMDS Increment 6 requirements and beyond for all COTS based open architecture baselines.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>Title: Aegis BMD 4.x Development</p> <p align="right">Articles:</p> <p>Description: Aegis BMD 4.1 incorporates the BMD 5.0 CU capability of EPAA Phase II ENDO/EXO requirements including EPAA Phase II Exo-atmospheric threats, integration of the SM-3 Block IB Threat Upgrade (TU), and reintroduction of other Aegis capabilities integrated with the SM-6 Dual I (Endo only). It provides Aegis Modernization capabilities comparable to the BMD 4.0 ships with legacy computer processing architecture. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Decrease from FY 2017 to FY 2018 reflects refinement of integration scope with USN. - Conduct Aegis Baseline 5.4 (BMD 4.1) computer program integration efforts, capability development and coding - Conduct Aegis Baseline 5.4 (BMD 4.1) unit test and element computer program integration and test - Conduct Aegis Baseline 5.4 (BMD 4.1) Engineering Test and Evaluation (ET&E), Multi-Element Integration and Test (MEIT) with regression testing - Accelerated delivery of certified 4.1 baseline</p> <p>FY 2019 Plans: - Complete Aegis Baseline 5.4 (BMD 4.1) computer program integration efforts, capability development and coding - Complete Aegis Baseline 5.4 (BMD 4.1) unit test and element computer program integration and test - Complete Aegis Baseline 5.4 (BMD 4.1) Engineering Test and Evaluation (ET&E), Multi-Element Integration and Test (MEIT) with regression testing - Conduct Aegis Baseline 5.4 (BMD 4.1) Engineering Assessment (EA), Ship Installation and Test, U.S. Navy At-Sea Testing and Certification</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects majority of development for Aegis Baseline 5.4 (BMD 4.1) completion in 2018. Final development, testing and certification will be done in FY 2019.</p>	47.330	28.071	25.231
Title: Aegis BMD 5.x Development	97.368	63.400	16.177
Articles:	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Description: Aegis BMD 5.1 builds upon BMD 5.0 CU and will further expand the threat set to include those threats required for EPAA Phase III through the integration of the SM-3 Block IIA, introduction of EoR capability, and improved BMDS interoperability and engagement coordination. In addition to expanding the BMD battlespace, EoR with SM-3 Block IIA frees up radar resources and increases the number and type of threats that can be engaged simultaneously over previous baselines. Aegis BMD Phase 1 capabilities include SM-3 Block IIA missile integration, SM-3 weapons selection algorithm, enhanced tracking, discrimination and mission planner updates to support organic engagements, Launch-on-Remote (LoR) engagements, and Long Range Surveillance & Tracking (LRS&T) missions. Aegis BMD 5.1 Phase 1 integration, testing, and evaluation (IT&E) events include various lab-based and shipboard weapon-system-to-missile integration testing utilizing the Virtual Operational Missile (VOM) and the Inert Operational Missile (IOM), as well as participation in BMDS-wide ground test campaigns. Aegis BMD 5.1 Phase 1 development supports early integration and testing with the SM-3 Block IIA missile testing planned for SFTM-1 and SFTM-2. The development of partial capability is contiguous across both Phase 1 and Phase 2 and supports delivery for EPAA Phase III. Aegis BMD 5.1 Combat System certification occurs in FY 2018.</p> <p>Recurring Accomplishments: - Continue supporting BMDS ground test events, collecting Objective Qualitative Evidence (OQE) to support MDA OCB reviews, and EPAA Phase III TCD</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Decrease from FY 2017 to FY 2018 reflects completion of development functionality implementation and completion of baseline certification testing</p> <ul style="list-style-type: none"> - Continue development testing at-sea, supporting BMDS ground test events, collecting objective qualitative evidence (OQE) to support U.S. Navy certification, MDA Operational Capability Baseline review, and EPAA Phase III Technical Capability Declaration (TCD) - Incorporate developmental and maintenance Computer Program Correction Reports (CPCRs) as defined from Developmental Testing (DT) - Complete system functional testing at both lab-based and shipboard installations. Includes integration, checkout, pre-mission analysis, preparation activities, and post-mission analyses to provide the critical Objective Qualify Evidence (OBE) in support U.S. Navy certification of the Aegis BMD 5.1 computer program - Conduct C2P Tech Refresh and Common Data Link Management System (CDLMS) 3.9 to support pre-mission analysis of EoR engagement, to support the installation on ships and ashore - Conduct development testing to assess Aegis BMD 5.1 computer program compliance with maintainability requirements - Perform assessment cycles to evaluate system maturity and progress towards certification and deployment of the Aegis BMD 5.1 computer program at sea and ashore for EPAA Phase III <p>FY 2019 Plans:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018		FY 2019
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<ul style="list-style-type: none"> - Continue supporting BMDS ground test events, collecting Objective Qualitative Evidence (OQE) to support MDA OCB reviews, and EPAA Phase III TCD - Conduct Flight Test Events, and related preparation activities (pre-mission analysis, shipboard and land-based test site installation, checkout, and integration, and post-mission analysis) <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects completion of Navy certification of the baseline and related development efforts in FY 2018.</p>				
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Title: Aegis BMD 6.x Development	15.807	80.917		65.030
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	Articles:	-		-
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Description: U.S. Navy is developing the Advance Capability Build (ACB) 20 Combat System (CS) and the Air and Missile Defense Radar (AMDR), now designated SPY-6, for introduction on the first DDG Flight III. . Aegis BMD 6.0 will integrate BMD 5.1 capability with the ACB 20 Combat System, to include new SPY-6 requirements; this will enable BMDS element utilization of AMDR data for remote engagements and supplement deployed assets with simultaneous multi-mission capabilities (e.g. IAMD). SPY-6 will support force-level (multi-asset) approach to raid defense and will enable U.S. Navy ships to have a greater stand-off range from threat environments.

Recurring Accomplishments:

- Develop CIDS, Interface Description Specifications (IDS) and all supporting engineering document and plans
- Conduct trade studies and concepts supporting development
- Conduct Aegis BMD low-level performance analysis supporting Interim Progress Reviews (IPR)
- Continued participation in program leadership and technical forums including Program Management Team, System Engineering Cross Product Team (CPT), Capability Working Groups, Modeling & Simulation CPT, and Test, Evaluation & Certification CPT
- Continue computer program development for Aegis BMD 6.0

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:
Increase from FY 2017 to FY 2018 attributed to detailed design of Aegis BMD 6.0 in preparation for Critical Design Review (CDR) which will finalize the baseline program performance requirements.

FY 2019 Plans:

- Execute coordinated development with U.S. Navy on the combined computer program
- Prepare for and conduct Aegis BMD performance analysis supporting CDR/Interim Program Review (IPR)
- Compile Element Review Team (ERT) and CDR/IPR data packages and begin Element Technical Reviews (ETR) to validate system requirements
- MDA/Navy co-funded effort to provide BMD capability on Flight III DDGs

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>-Continue BMD 6.0 requirement updates, trade studies, design efforts, computer program coding and performance testing All efforts beyond 6.0 have transitioned to Budget Project, MD09 Weapon System Capability Insertion.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 due to the Aegis Weapon System Program has changed its strategy for computer program development. The program is moving away from the incremental development strategy and is implementing an Agile Software Development Approach.</p> <p>Decrease from FY 2018 to FY 2019 reflects transitioning effort beyond 6.0 to Budget Project MD09, Weapon System Capability Insertion and transitioning to 6.0 SM-3 Missile efforts to Budget Project MM09.</p> <p>FY 2019 BMD 6.0 development increase reflects addition of scope beyond BMD 5.1 and transitioning from requirements efforts to design and software development efforts to include BMD 6.0 Tactical Computer Program Integration into U.S. Navy Baseline 10/ACB20 Program.</p>				
<p>Title: Weapon System Capability Insertion</p> <p align="right">Articles:</p> <p>Description: New capability insertion methodology to capture Aegis BMD capability upgrades to U.S. Navy Destroyers (FLT II, IIA and III). Future capability developments beyond Aegis BMD 6.0 will incrementally continue to provide increased BMD capability with the SPY-1 and SPY-6 radars. These will include further updates for advanced threats, advanced mission planning, search, track, discrimination improvements; and kill assessment updates. SPY-6 will support force-level (multi-asset) approach to raid defense and will enable Navy ships to have a greater stand-off range from threat environments. These future capabilities will serve as the path forward to achieve BMDS Increment 6 requirements and beyond for all modernized BMD baselines. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: N/A</p> <p>FY 2019 Plans: All efforts for this accomplishment have transitioned from Budget Project, MD09 Aegis 6.0 development (beyond 6.0 efforts). - Transition technology mature capability to BMD baselines for development and testing and align with the U.S. Navy on Aegis ship and ashore capability deliveries on an annual basis - Initiate execution of coordinated development with U.S. Navy on the combined computer program - Prepare and conduct Software Incremental Reviews (SWIRs) to provide status of development - Conduct Element Technical Reviews (ETR) to validate system requirements</p>		0.000 -	0.000 -	30.463 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
- Conduct integration and development level testing to verify element and system level requirements				
FY 2018 to FY 2019 Increase/Decrease Statement: In FY 2019, the Aegis Weapon System Program has changed its strategy for computer program development. The Program is moving away from the incremental development strategy and is implementing an Agile Software Development approach.				
Title: Standard Missile-3 (SM-3) Block IB Development		2.116	0.000	0.000
Articles:		-	-	-
Description: This effort develops the SM-3 Block IB missile, which improves on the SM-3 Block IA performance and enables engagement of more sophisticated ballistic missiles and larger raid sizes. SM-3 Block IB Modernization will provide the following upgrades: - Upgraded SM-3 KW Common Avionics Package will provide improved producibility and reduced cost resulting from utilization of common components between SM-3 Block IIA and the Redesigned Kill Vehicle (RKV). SM-3 Block IB Common Components will be extendable to support different form/fit in circuit card assemblies across SM-3 Block IB, SM-3 Block IIA, and RKV and will mitigate SM-3 Block IB hardware availability issues. - Upgraded SM-3 Block IB Guidance Section (GS) will resolve Computer Processing Unit 3 and Plate 3A hardware availability issues, enable use of 5.1/IIA Target Object Map (TOM) and similar software to SM-3 Block IIA Mission Computer; and enable additional capability against complex threats. Specific and/or unique accomplishments to each FY are as follows:				
FY 2018 Plans: All efforts for this accomplishment have transitioned to Budget Project, MM09 Aegis BMD SM-3 Development				
FY 2019 Plans: N/A				
FY 2018 to FY 2019 Increase/Decrease Statement: N/A				
Title: Standard Missile-3 (SM-3) Block IIA Development		182.681	0.000	0.000
Articles:		-	-	-
Description: The SM-3 Block IIA is required to meet EPAA Phase III. It will increase the area that can be defended by Aegis BMD, increase the probability of kill against a larger threat set, and leverage enhanced capability provided by BMDS sensor upgrades. Recurring Accomplishments: - Conduct SM-3 Block IIA software update to support engagements against additional complex threats identified during Aegis BMD 5.1 design process conducted after missile Critical Design Review (CDR)				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Conduct End to End Distributed Development System (ETEDDS) integration testing; and flight test support</p> <p>- Continue implementation of SM-3 Block IIA cost reduction initiatives to support meeting cost goals to reduce the current estimated Average Unit Production Price (AUPP)</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: All efforts for this accomplishment have transitioned to Budget Project, MM09 Aegis BMD SM-3 Development.</p> <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
<p>Title: Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion</p> <p align="right">Articles:</p> <p>Description: Aegis BMD Core System Engineering enables cross-baseline specification management and capability assessments to ensure consistent application of technical standards, processes, and procedures across the Aegis BMD program. Efforts include: systems engineering and architecture (process and execution), modeling and simulation (M&S), test and evaluation support, ship integration, quality, safety and mission assurance.</p> <p>Recurring Accomplishments:</p> <ul style="list-style-type: none"> - Test and certify Deterministic Routing for Aegis Ashore and Aegis BMD ships to maintain interoperability with the BMDS - Conduct U.S. Navy and Joint Link certifications required for BMD Baseline certifications for operational deployment - Continue Ground Test Campaign support for BMDS in support of Operational Capability Baseline (OCB) declaration - Conduct BMDS-level V& V activities and provide results to MDA System Verification Team and the OTA in support of BMD system level accreditation for BMDS events - Continue model development and sustainment required for participation in exercises and force-on-force analysis in support of the warfighter/Combatant Commands (CCMDs) - Provide BMDS M&S Requirements Management and Development - Conduct further development of Aegis BMD System Architecture and overarching system concepts - Conduct BMDS system level requirements allocation and Aegis BMD system requirements development, trace, validation and verification, and configuration management for coordination with all participating external agencies and organizations - Conduct Command, Control, Computer, Communications and Intelligence (C4I) systems engineering to further develop Aegis BMD requirements, and to identify and resolve BMDS interoperability issues - Define and coordinate development and implementation of C4I capabilities in U.S. Navy C4I programs of record to meet Aegis BMD requirements 		36.745 -	38.558 -	36.389 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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- Conduct Threat Engineering analysis
- Conduct Systems Engineering for Aegis BMD system-level M&S development and interfaces to the BMDS architecture
- Provide verified, validated, accredited models in support of U.S. Navy certification, MDA characterization of system-level performance, Operational Test Agency (OTA) assessment of operational capabilities, and representation of Aegis BMD capabilities in BMD test and exercise venues
- Provide target engineering, test planning activities, and IMTP process/inputs for Aegis BMD
- Conduct Performance Assessment and Verification (PAV) processes which assess the sufficiency of Objective Quality Evidence (OQE) to provide a traceable evidence to verify ES requirements traced to BMDS requirements
- Provide oversight of all Aegis BMD analysis in support of systems assessment and verification supporting test and analysis requirements and test planning inputs to align with MDA and U.S. Navy test programs
- Provide consolidated analysis and reporting for firing events

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:

- Increase from FY 2017 to FY 2018 reflects the development of C4I capabilities to support commencement of Aegis BMD 6.x baseline, and increased element-level support for discrimination improvements and countermeasures mitigation.
- Continue software upgrades for SM-3 6DoF integration and IAMD in support of COMOPTEVFOR Verification, Validation & Assessment (VV&A) and OT RFRs
 - Continue Aegis BMD CEC/EME tasks to support improvement of development and models of System or Element behaviors
 - Complete development of discrimination improvements to improve detection, tracking, discriminating, and correlation of threats
 - Complete Near-Term discrimination algorithm insertion and testing
 - Continue to develop and mature RF and IR Mid-Term discrimination algorithms, modeling and simulation, and prototype codes for AN/SPY-1 and SM-3, respectively
 - Continue to develop and mature Weapon Systems algorithm concepts and modeling and simulation updates which exploit AN/SPY-6 design features
 - Complete system modifications required for implementation of Link 16 Interface Change Proposals required for Mid-Term discrimination

FY 2019 Plans:

- Conduct Science & Technology evaluations, identify solutions for identified system needs, conduct concept exploration and related trade studies
- Complete development of initial RF Mid-Term discrimination algorithms within the B/L 9 architecture
- Execute Electronic Protection analysis and develop initial Electronic Attack mitigation concepts

	FY 2017	FY 2018	FY 2019

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD		Project (Number/Name) MD09 / Aegis BMD
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Design, develop, test, and certify overhead satellite data sources to meet Aegis BMD fire control capabilities in support of dual path requirement in Aegis BMD 5.1 - Continue model development and V&V in support of COMOPTEVFORBL 9.C2 M&S accreditation - Continue support and oversight of development, integration and sustainment of M&S in support of BMD 6 - Continue to develop and mature Regional Sensor Advanced Discrimination solutions and modeling and simulation updates for multiple Aegis BMD architectures <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
<p>Title: Program Operations</p> <p align="right">Articles:</p> <p>Description: This accomplishment has recurring efforts. This activity funds the Government, contractor, and Federally Funded Research and Development Center (FFRDC) workforce that manage the overall Aegis Ballistic Missile Defense (BMD) program and enables the program to develop, build, and test standard missiles and the associated Aegis Weapon Systems. This project includes all operations support for the Aegis program office in Engineering, Testing, Logistics, Acquisition, Safety, Quality Assurance, Finance, Budget Formulation and Execution, Cost Estimation, and Earned Value Management in support of development activities. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: All efforts for this accomplishment have transitioned to Budget Project, MX09 Aegis Ballistic Weapon System Integration and Operations</p> <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>		114.541	0.000	0.000
		-	-	-
<p>Title: FY16 SM-3 Block IIA RDT&E All Up Rounds</p> <p align="right">Articles:</p> <p>Description: Manufacture FY 2016 SM-3 Block IIA All Up Rounds (AURs) for the purposes of flight testing and delivery to the fleet as operational assets prior to an initial production decision. Recurring Accomplishment: Deliver SM-3 Block IIA AURs Specific and/or unique accomplishments to each FY are as follows:</p>		185.687	0.000	0.000
		-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>FY 2018 Plans: All efforts for this accomplishment have transitioned to Budget Project, MG09 Aegis BMD SM-3 Development Articles</p> <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>			
<p>Title: Modeling & Simulation Objective Simulation Framework</p> <p align="right">Articles:</p> <p>Description: This effort develops, maintains and deploys the framework hardware and software for use at element laboratories and Combatant Command (CCMD) locations to support IMTP events, BMDS capability delivery assessments, Warfighter training, exercises, and wargames.</p> <p>Recurring Accomplishments:</p> <ul style="list-style-type: none"> - Develop and implement Objective Simulation Framework (OSF) upgrades to incorporate advanced tracking, discrimination, engagement and associated upper tier debris mitigation capabilities, as well as other requirements and capabilities to meet MDA's evolving M&S Enterprise needs. - Sustain and enhance framework products to maintain capabilities to support stakeholders. - Develop plans, procedures and documentation for scheduled events including Wargames and Combatant Command Exercises and the Distributed, Focused and Integrated HWIL Events as presented in the IMTP. Provide event architecture integration and checkout of Wargames for these same IMTP scheduled events. - Provide the ground test architecture integration expertise to meet the testing requirements of the IMTP. Support delivery of integrated architectures for test across all test venues using the BMDS test framework to integrate distributed architectures in support of BMDS. - Develop, maintain, test, field, and operate model representations for use in events and other MDA M&S stakeholder application areas. Deploy hardware and software updates to distributed sites. Perform regular maintenance and critical repairs of hardware and software. - Support MDA's Experimental End-to-end Digital Integrated System-level Simulation (X-EDISS) requirements, referred to Tier 2 Digital in previous reports, including hardware and software, data storage and transmission, and verification tools. - Control and maintain the M&S Integration and Development Laboratories for Element M&S. Maintain venue for stakeholders to conduct early integration efforts and identification of issues prior to event architecture integration to support system development. - Deploy System Interface Units (SIUs) for BMDS testing - materials, licenses, SIU fleet purchasing. Deploy SIUs and components to maintain and sustain SIU fleet including cybersecurity; enables Developmental and Operational testing with full BMDS as required in IMTP. 	41.535 -	37.141 -	35.882 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Continue maintenance of the Single Stimulation Framework in the required venues until the transition of the Objective Simulation Framework into the venues completes. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: -SEE ABOVE.</p> <p>FY 2019 Plans: -SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
Title: Systems Engineering & Integration		20.108	18.530	19.310
		Articles: -	-	-
<p>Description: Perform requirements development, engineering analysis, capability integration, and performance verification for Aegis BMD development and BMDS integration, including Aegis BMD compliance with the BMDS Specification, BMDS Description Document, and Master Integration Plan (MIP). Recurring Accomplishments:</p> <ul style="list-style-type: none"> - Conduct system level performance analyses to support ongoing BMDS Architecture and Systems Engineering efforts - Perform top-down system level engineering analysis, capability integration, and performance verification for Aegis BMD development and BMDS integration, including Aegis BMD compliance with the BMD System Specification, BMD System Description Document, and Master Integration Plan (MIP) - Identify architecture alternatives that improve the BMD System's performance and are complementary to and interoperable with NATO systems and theaters around the world - Define BMDS technical content expectations and develop system requirements, to include integration of new capabilities, such as the U.S. Navy's Air and Missile Defense Radar (AMDR) - Develop functional performance, interface, and design suitability requirements in collaboration with Aegis BMD engineers to ensure correct flow-down and allocation of BMD System-level requirements to Aegis BMD - Respond to Warfighter, Combatant Command and other requests for analyses and requests for information; provide analytical support for real-world events - Conduct non-advocate assessments of BMDS capabilities and limitations prior to capability delivery decisions to determine fielding readiness (including Theater/Regional BMD) - Conduct extensive analysis of data collected in BMD test events to evaluate BMD System operations and performance. <p>Specific and/or unique accomplishments to each FY are as follows:</p>				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD		Project (Number/Name) MD09 / Aegis BMD
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
<p>Title: M&S BMDS Simulations & Tools</p> <p align="right">Articles:</p> <p>Description: This effort includes: development and sustainment of digital products and the architecture framework, and delivery/maintenance of infrastructure for BMDS performance assessments. Recurring Accomplishments: - Integrate, test, and verify the M&S enterprise supporting BMDS testing, assessment, exercises, and wargaming, including testing infrastructure. Guide and facilitate integration testing of MDA's M&S frameworks and core truth models, and all M&S components into virtual representations of the BMDS that are credible, affordable, and provide decision makers with the data needed - Integrate, test, functionally qualify, and deliver M&S tools and complex test architectures to provide system test capabilities to support MDA IMTP based test events, wargames, and exercises - Continue the transition of real-time digital simulation capability to the OSF to support Intended Uses - Provide HWIL/M&S Benchmarking/Integration documentation and coordination - Conduct M&S system integration and verification to support M&S system architecture development. Provide developmental integration testing to support M&S system architecture integration Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>		5.158 -	5.227 -	4.767 -
<p>Title: BMDS Verification, Validation & Assessment (VV&A)</p> <p align="right">Articles:</p>		22.135 -	20.219 -	20.437 -

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Description: This activity funds BMD System Assessment and VV&A activities to support BMDS Operational Capacity Baseline (OCB) delivery decisions and Technical Capability Declarations (TCDs), and anchor System modeling and simulation.</p> <p>Recurring Accomplishments:</p> <ul style="list-style-type: none"> - Verify BMDS performance, and produce BMDS verification status reports - Conduct extensive analysis of data collected in BMDS ground and flight test events, instrumental to understanding BMD System operations and performance and anchoring models and simulations - Identify mitigation approaches for BMDS performance issues uncovered during system level analysis and assessment - Maintain M&S VV&A database, and verification data for BMD System Specification Change Notices - Develop, maintain, and update the M&S VV&A tool kit - Provide recommendations for improving assessment confidence, including M&S and testing issue resolutions - Conduct verification and validation (V&V) in support of MDA BMD System level accreditation process in support of BMDS Ground Test and performance assessment events - Conduct specified BMD System post-flight reconstructions, element post-flight reconstructions, and pre-mission testing events so as to optimize the body of evidence and analysis supporting system-level BMDS accreditation. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>			
Accomplishments/Planned Programs Subtotals	771.211	292.063	253.686

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0604878C: Aegis BMD Test	131.012	137.783	95.756	-	95.756	80.684	94.138	146.910	137.601	Continuing	Continuing
• 0604880C: Land Based SM-3 (LBSM3)	40.452	30.486	27.692	-	27.692	29.263	28.370	27.228	28.225	Continuing	Continuing
• 0604881C: AEGIS SM-3 Block IIA Co-Development	102.272	9.739	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	112.011

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

The Aegis BMD element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the SM-3 and the Aegis BMD Weapon System, respectively.

The M&S acquisition strategy utilizes full and open competition to develop, acquire and deliver the integrated architectures/frameworks, as well as develop and deliver models of Aegis systems. The Digital and HWIL product centers integrate the suite of M&S into a composite simulation capability, all based on an open architecture. M&S achieves this end-state via close collaboration between its integrating contractor teams (Digital and HWIL) and those of the Aegis BMD prime contractors, with additional technical standards and engineering oversight provided by Federally Funded Research and Development Centers (FFRDCs) and University Affiliated Research Centers (UARCs).

E. Performance Metrics

Aegis BMD utilizes Award Fee and Incentive-based contracts to ensure project completes on time

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Aegis BMD 4.x Development - BMD 4.0 Dev -MD09- Aegis Techrep	MIPR	AEGIS Techrep : Moorestown, NJ	2.114	0.539	Nov 2016	1.422	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. - MD09 - D	MIPR	MDA : VA	25.651	4.745	Jul 2017	2.608	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. - MD09 - Dahlgren	MIPR	NSWC/DD : DAHLGREN, VA	140.805	6.272	Nov 2016	1.956	Nov 2017	3.769	Nov 2018	-		3.769	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. - MD09 - Lockheed Martin	SS/CPHF	LOCKHEED MARTIN : MOORESTOWN, NJ	760.116	35.774	Nov 2016	22.085	Nov 2017	19.954	Nov 2018	-		19.954	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. -MD09- BMD 4.0 Dev- No longer funded in the FYDP	Various	Various : Various	43.102	0.000		0.000		1.508		-		1.508	0.000	44.610	0.000
Aegis BMD 5.x Development - 6.x - D	MIPR	MDA : Ft. Belvoir, VA	0.000	0.000		2.708	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 20117142323680	MIPR	NSWC/DD : DAHLGREN, VA	46.545	13.589	Nov 2016	12.270	Nov 2017	2.409	Nov 2018	-		2.409	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 20117142323684	MIPR	NSWC/PHD : PT HUENEME, CA	7.873	1.715	Nov 2016	1.230	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 20117142323686	SS/CPFF	JHU/APL/MD : COLUMBIA, MD	46.298	5.238	Nov 2016	3.720	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 20117142323689	SS/CPAF	LOCKHEED MARTIN : MOORESTOWN, NJ	591.317	69.776	Nov 2016	40.632	Nov 2017	12.120	Nov 2018	-		12.120	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - AW	MIPR	Aegis Tech Rep : Moorestown, NJ	2.049	0.352	Nov 2016	1.560	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Aegis BMD 5.x Development - MD09 - Various	MIPR	Various : MA, MD, VA, NJ	70.525	6.698		1.280	Nov 2017	1.648	Nov 2018	-		1.648	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09- No longer funded in the FYDP	Various	Various : various	129.494	0.000		0.000		0.000		-		0.000	0.000	129.494	0.000
Aegis BMD 6.x Development - Hanscom AFB - MIT/LL - TD	MIPR	Hanscom AFB - MIT/LL : MA	0.975	0.995		1.679	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - JHU/APL	SS/CPFF	JHU/APL : MD	1.775	2.086	Nov 2016	9.054	Nov 2017	3.902	Nov 2018	-		3.902	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - Lockheed Martin	C/CPFF	Lockheed Martin : NJ	5.836	4.269	Nov 2016	53.463	Nov 2017	53.324	Nov 2018	-		53.324	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - MD09 - DD	MIPR	NSWC/DD : Dahlgren, VA	2.225	2.751	Nov 2016	4.500	Nov 2017	3.902	Nov 2018	-		3.902	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - NAVSEA	MIPR	NAVSEA : Sudbury, MA	0.000	0.000		2.600	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - NSWC DD-TD	MIPR	NSWC/DD : VA	0.894	2.427	Jul 2017	1.733	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - Raytheon	MIPR	Raytheon : Tucson, AZ	1.375	0.000		6.508	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - Tech Rep	MIPR	Aegis TechRep : Moorestown, NJ	0.045	0.294		1.380	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - Various	MIPR	Various : MA, MD, VA, NJ, CA	0.000	2.985		0.000		3.902	Nov 2018	-		3.902	Continuing	Continuing	Continuing
Weapon System Capability Insertion - Capability Insertion	MIPR	NSWC DD : Dahlgren VA	0.000	0.000		0.000		5.896	Nov 2018	-		5.896	Continuing	Continuing	Continuing
Weapon System Capability Insertion - Capability Insertion 2	MIPR	NSWC PHD : Dahlgren VA	0.000	0.000		0.000		0.591	Nov 2018	-		0.591	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Weapon System Capability Insertion - Capability Insertion 3	SS/CPFF	JHU/APL : Columbia MD	0.000	0.000		0.000		1.787	Nov 2018	-		1.787	Continuing	Continuing	Continuing
Weapon System Capability Insertion - Capability Insertion 4	SS/CPAF	Lockheed Martin : Moorestown NJ	0.000	0.000		0.000		20.824	Nov 2018	-		20.824	Continuing	Continuing	Continuing
Weapon System Capability Insertion - Capability Insertion 6	MIPR	Various : MA, MD, VA, NJ	0.000	0.000		0.000		0.615	Nov 2018	-		0.615	Continuing	Continuing	Continuing
Weapon System Capability Insertion - Weapon Insertion 5	MIPR	Aegis Tech Rep : Moorestown NJ	0.000	0.000		0.000		0.750	Nov 2018	-		0.750	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development-MD09- Corona	MIPR	NSWC Corona : Corona, CA	1.349	0.233	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development-MD09	SS/CPAF	Raytheon : Tucson	1,022.526	1.073	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development-MD09- No longer funding in the FYDP	Various	Various : Various	127.066	0.733	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development-MD09-2011742332259	MIPR	NSWC/PHD : Port Huememe, CA	14.082	0.077	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - CA,VA, MD	MIPR	Various : CA, VA, MD	0.191	4.532	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Standard Missile-3 (SM-3) Block IIA Development - MD09 - SM-3 BLK IIA AFFORDABILITY DEVELOPMENT- No longer funding in the FYDP	SS/CPIF	Raytheon : Tucson, AZ	12.100	0.000		0.000		0.000		-		0.000	0.000	12.100	0.000
Standard Missile-3 (SM-3) Block IIA Development - MD09 - SM-3 BLK IIA INTEGRATION	SS/CPIF	Raytheon : Tucson, AZ	103.892	160.132	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - MD09 - SM-3 BLK IIA INTEGRATION - APL	MIPR	JHU/APL : Laurel, MD	13.625	13.981	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - MD09 - SM-3 BLK IIA INTEGRATION - DD	MIPR	NSWC DD : VA	10.247	1.939	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - NSWC Corona	MIPR	NSWC : Corona, CA	0.010	1.259	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - NSWC/Crane	MIPR	NSWC/Crane : IN	0.000	0.838	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD APL	MIPR	JHU/APL : Columbia, MD	9.462	7.878	Nov 2016	7.793	Nov 2017	7.904	Nov 2018	-		7.904	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD LM	C/CPFF	Lockheed Martin : Moorestown, NJ	8.822	8.782	Nov 2016	6.212	Nov 2017	5.039	Nov 2018	-		5.039	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD MIT	MIPR	Hanscom AFB - MIT/LL : Lexington, MA	5.829	4.674	Dec 2016	3.169	Nov 2017	3.169	Nov 2018	-		3.169	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD MITRE	MIPR	CECOM - MITRE : Dahlgren, VA	0.626	0.391	Dec 2016	1.228	Nov 2017	1.228	Nov 2018	-		1.228	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD NSWCCD	MIPR	NSWC DD : Dahlgren, VA	8.477	8.936	Feb 2017	7.753	Nov 2017	7.285	Nov 2018	-		7.285	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 Raytheon	SS/CPAF	Raytheon : AZ	1.587	0.000		0.825	Apr 2018	0.825	Nov 2018	-		0.825	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09- Technology Design and Insertion-TD No longer funding in the FYDP	Various	Various, : Various	2.500	5.334	Feb 2017	0.000		0.000		-		0.000	0.000	7.834	0.000
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - SPAWAR	MIPR	SPAWAR : San Diego, CA	0.322	0.750		5.255	Dec 2017	5.255	Nov 2018	-		5.255	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - Technology Design and Insertion - Discrimination	MIPR	Various - MDA : AL,VA	9.972	0.000		6.000	Nov 2017	5.684	Nov 2018	-		5.684	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - Various - MDA	MIPR	Various - MDA : AL,VA,CA	2.471	0.000		0.323	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
FY16 SM-3 Block IIA RDT&E All Up Rounds	MIPR	MIT/LL : MA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
- FY 16 SM-3 Block IIA RDT&E All Up Rounds-MIT/LL															
FY16 SM-3 Block IIA RDT&E All Up Rounds - NSWC/DD	MIPR	NSWC/DD : Dahlgren, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
FY16 SM-3 Block IIA RDT&E All Up Rounds - SM-3 MANUFACTURING - MD09	SS/CPAF	Raytheon : Tucson, AZ	471.421	170.037	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
FY16 SM-3 Block IIA RDT&E All Up Rounds - Various	MIPR	Various : Washington DC	0.000	15.650	May 2017	0.000		0.000		-		0.000	0.000	15.650	0.000
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering	Various	MDA : AL, VA	8.319	4.269	Nov 2016	1.763	Nov 2017	3.211	Nov 2018	-		3.211	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - CSS Support	C/CPFF	MiDAESS / TEAMS : AL, CO	16.098	1.451		1.095	Nov 2017	4.480	Nov 2018	-		4.480	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - Engineering Support	C/CPAF	Northrop Grumman : CO	17.644	6.222	Nov 2016	8.613	Nov 2017	5.845	Nov 2018	-		5.845	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - Integration	MIPR	AMRDEC : AL	16.455	4.043	Nov 2016	4.318	Nov 2017	2.887	Nov 2018	-		2.887	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - Prime	C/CPFF	Teledyne Brown Engineering : AL, CO	91.410	25.550	Nov 2016	21.352	Nov 2017	19.459	Nov 2018	-		19.459	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering & Integration - Systems Engineering	Various	MDA Various : VA, AL	55.572	6.787	Nov 2016	3.620	Oct 2017	2.111	Nov 2018	-		2.111	Continuing	Continuing	Continuing
Systems Engineering & Integration - Systems Engineering - CSS	C/CPFF	MiDAESS / TEAMS : VA	14.227	2.236	Nov 2016	0.945	Nov 2017	3.113	Nov 2018	-		3.113	Continuing	Continuing	Continuing
Systems Engineering & Integration - Systems Engineering - Industry	C/CPAF	Boeing : VA	37.940	11.085	Nov 2016	13.965	Nov 2017	14.086	Nov 2018	-		14.086	Continuing	Continuing	Continuing
M&S BMDS Simulations & Tools - Sims & Tools	C/CPFF	Teledyne Brown Engineering : AL, CO	0.000	1.130	Nov 2016	1.243	Nov 2017	1.298	Nov 2018	-		1.298	Continuing	Continuing	Continuing
M&S BMDS Simulations & Tools - Sims & Tools - Industry	C/CPAF	Northrop Grumman : CO	29.042	4.028	Nov 2016	3.984	Nov 2017	3.469	Nov 2018	-		3.469	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment	Various	MDA Various : AL, VA	0.000	0.773		0.709	Nov 2017	1.759	Nov 2018	-		1.759	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - CSS Support	C/CPFF	MiDAESS / TEAMS : AL	8.572	3.960	Nov 2016	2.210	Nov 2017	1.323	Nov 2018	-		1.323	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - CSS Support (2)-No longer funding in the FYDP	C/CPFF	Sparta : AL	1.030	0.555	Nov 2016	0.000		0.000		-		0.000	0.000	1.585	0.000
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - Industry	C/CPAF	Boeing : AL	7.989	6.927	Nov 2016	6.165	Nov 2017	6.429	Nov 2018	-		6.429	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment	MIPR	MITRE : VA	5.108	1.539	Nov 2016	1.174	Nov 2017	1.196	Nov 2018	-		1.196	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency											Date: February 2018				
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD					Project (Number/Name) MD09 / Aegis BMD				

Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
(VV&A) - Verification & Assessment - Labs															
BMDs Verification, Validation & Assessment (VV&A) - Verification & Assessment - OGA	MIPR	AMRDEC : AL	13.052	7.338	Nov 2016	7.432	Nov 2017	7.662	Nov 2018	-		7.662	Continuing	Continuing	Continuing
BMDs Verification, Validation & Assessment (VV&A) - Verification & Assessment - UARC	MIPR	GTRI : GA, AL	1.119	1.043	Nov 2016	1.100	Nov 2017	0.000		-		0.000	0.000	3.262	0.000
BMDs Verification, Validation & Assessment (VV&A) - Verification & Assessment - UARC2	MIPR	JHU/APL : AL, VA	0.000	0.000		1.429	Nov 2017	2.068	Nov 2018	-		2.068	Continuing	Continuing	Continuing
Subtotal			4,029.168	656.670		292.063		253.686		-		253.686	Continuing	Continuing	N/A

Remarks

N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Operations - MD09 - Civ Sal	MIPR	MDA : Arlington, VA	60.610	34.746	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - MD09 - DD PM	MIPR	NSWC DD : Dahlgren, VA	14.649	8.658	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - MD09 - IT	MIPR	MDA : Arlington, VA	0.700	1.618	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - MD09 - MDA Travel	MIPR	MDA : Arlington, VA	3.675	2.737	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - MD09 - MIDAESS	MIPR	MDA : Arlington, VA	97.571	48.679	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Operations - MD09 - NAVSEA Civ Sal	MIPR	NAVSEA : Washington, DC	26.681	13.392	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - MD09 - NAVSEA RB Sal	MIPR	NAVSEA : Washington, DC	3.270	2.161	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - MD09 - NAVSEA Training, Various	MIPR	NAVSEA : Washington, DC	2.676	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - MD09 - NAVSEA Travel	MIPR	NAVSEA : Washington, DC	2.083	1.372	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - MD09 - Security	MIPR	Various : VA	2.768	1.178	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - MD09-Program Operations- No longer funding in the FYDP	MIPR	Various : VA	13.994	0.000		0.000		0.000		-		0.000	0.000	13.994	0.000
Subtotal			228.677	114.541		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
Remarks
*Increase from FY 2017 to FY 2018 (Lockheed Martin, NJ) due to detailed design of BMD 6.0 in preparation for CDR which will finalize the Baseline Program Performance requirements and Commencement of the BMD 6.1

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4,257.845	771.211	292.063	253.686	-	253.686	Continuing	Continuing	N/A

Remarks
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, MIPRs, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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	Significant Event Complete ▲			Milestone Decision Complete ★			Element Test Complete ◆			System Level Test Complete ●			Complete Activity ◆									
	Significant Event Planned △			Milestone Decision Planned ☆			Element Test Planned ◇			System Level Test Planned ○			Planned Activity ◇									
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023			
BL 5.4 IPR #2						◇																
BMD 6.0 IPR #1						◇																
BMD 5.1 Certification											△											
BMD 6.0 IPR #2											◇											
BL 5.4/BMD 4.x EA																						
BL 5.3.x/BMD 4.x Certification																						
BL 5.4 SRR																						
BMD 6.0 IPR #3																						
BMD 6.0 IPR #4																						
BL 5.4 PRD																						
BMD 6.0 IPR #5																						
BL 5.4 CDR																						
BMD 6.0 Demo																						
BMD 5.4 Demo																						
BL 5.4 Certification																						
BMD 6.0 Certification																						

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD09 / Aegis BMD
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
BL 5.4 IPR #2	1	2018	1	2018
BMD 6.0 IPR #1	1	2018	1	2018
BMD 5.1 Certification	4	2018	4	2018
BMD 6.0 IPR #2	4	2018	4	2018
BL 5.4/BMD 4.x EA	2	2019	2	2019
BL 5.3.x/BMD 4.x Certification	4	2019	4	2019
BL 5.4 SRR	2	2019	2	2019
BMD 6.0 IPR #3	2	2019	2	2019
BMD 6.0 IPR #4	1	2020	1	2020
BL 5.4 PRD	2	2020	2	2020
BMD 6.0 IPR #5	4	2020	4	2020
BL 5.4 CDR	2	2021	2	2021
BMD 6.0 Demo	2	2021	2	2021
BMD 5.4 Demo	2	2022	2	2022
BL 5.4 Certification	4	2022	4	2022
BMD 6.0 Certification	2	2023	2	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD					Project (Number/Name) MG09 / Aegis BMD SM-3 Development Articles		
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MG09: Aegis BMD SM-3 Development Articles	-	0.000	253.276	120.217	-	120.217	0.000	0.000	0.000	0.000	0.000	373.493
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2018 to FY 2019 reflects the completion of the SM-3 Block IIA FY16 manufacturing contract.

A. Mission Description and Budget Item Justification

This project supports Aegis BMD purchase of Development Articles to use as test articles, and initial deployment in support of EPAA Phase III. Includes Manufacturing of SM-3 Block IIA All Up Round (AUR) for the purposes of flight testing and delivery to the fleet as operational assets, and to ensure the maturation of SM-3 Block IIA manufacturing process.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: FY16 SM-3 Block IIA RDT&E All Up Rounds	0.000	212.029	120.217
Articles:	-	-	-
<p>Description: Manufacture seventeen (17) SM-3 Block IIA All Up Rounds (AURs) (delivered FY 2018 through FY 2020) for the purposes of flight testing as reflected in the IMTP and delivery to the fleet as operational assets prior to an initial production decision in support of EPAA Phase III. SM-3 Block IIA AURs validate the Engineering Manufacturing Readiness Level 3 criteria for an Initial Production Decision scheduled 4Q FY 2018.</p> <p>Recurring Accomplishment: Deliver SM-3 Block IIA AURs</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: FY16 SM-3 Block IIA RDT&E All Up Rounds efforts transferred from Project MD09, Aegis BMD. Decrease from FY 2017 to FY 2018 to match manufacturing schedule for incremental phasing of FY 2016 All-Up-Rounds. Continue funding for quantity 17 SM-3 Block IIA AURs (delivered FY 2018 through FY 2020) for use in flight test as reflected in the IMTP, and initial deployment of EPAA Phase III. SM-3 Block IIA AURs validate the Engineering Manufacturing Readiness Level 3 criteria for an Initial Production Decision scheduled 4Q FY 2018.</p> <p>FY 2019 Plans: - Complete FY16 SM-3 Block IIA RDT&E All Up Rounds purchase.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MG09 / Aegis BMD SM-3 Development Articles

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Decrease from FY 2018 to FY 2019 reflects SM-3 Block IIA incremental funding levels synchronized to support manufacturing expenditure profile for seventeen FY16 contracted SM-3 Block IIA AURs funding requirements aligned with increments of component, sub-section and section manufacturing and delivery schedules to support AUR deliveries beginning FY2018.			
Title: FY18 SM-3 Block IIA RDT&E All Up Rounds	0.000	41.247	0.000
Articles:	-	-	-
Description: Purchase of six (6) SM-3 Block IIA AURs for delivery to the fleet as operational assets, delivered from FY 2021 through FY 2022 Recurring Accomplishment: - Continue Incremental funding of six SM-3 Block IIA AURs for flight testing and delivery to the fleet as operational assets - Ensure the maturation of SM-3 Block IIA manufacturing process and mitigate impacts of a production gap - All Up Rounds utilized to achieve Engineering Manufacturing Readiness Level 4 Specific and/or unique accomplishments to each FY are as follows: FY 2018 Plans: In PB-2017 this requirement was captured in Aegis BMD MD09 Procurement account - Incremental funding of six SM-3 Block IIA AURs for flight testing and delivery to the fleet as operational assets FY 2019 Plans: - SEE ABOVE. FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects FY18 Appropriation Conference marks			
Accomplishments/Planned Programs Subtotals	0.000	253.276	120.217

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Aegis BMD element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the SM-3 and the Aegis BMD Weapon System, respectively.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / <i>AEGIS BMD</i>	Project (Number/Name) MG09 / <i>Aegis BMD SM-3 Development Articles</i>

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)					
0400 / 4					PE 0603892C / AEGIS BMD					MG09 / Aegis BMD SM-3 Development Articles					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
FY16 SM-3 Block IIA RDT&E All Up Rounds - FY16 SM-3 Block IIA RDT&E All Up Rounds - IWS	MIPR	NAVSEA IWS : Washington DC	0.000	0.000		7.523	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
FY16 SM-3 Block IIA RDT&E All Up Rounds - FY16 SM-3 Block IIA RDT&E All Up Rounds - NSWC/DD	MIPR	NSWC/DD : Dahlgren, VA	0.000	0.000		2.000	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
FY16 SM-3 Block IIA RDT&E All Up Rounds - FY16 SM-3 Block IIA RDT&E All Up Rounds - SM-3 MANUFACTURING - MG09	SS/CPAF	Raytheon : Tuscon, AZ	0.000	0.000		202.506	Nov 2017	118.217		-		118.217	Continuing	Continuing	Continuing
FY16 SM-3 Block IIA RDT&E All Up Rounds - FY16 SM-3 Block IIA RDT&E All Up Rounds-Various	MIPR	Various : Various, CA, VA, MD	0.000	0.000		0.000		2.000	Apr 2019	-		2.000	Continuing	Continuing	Continuing
FY18 SM-3 Block IIA RDT&E All Up Rounds - FY18 SM-3 Block IIA RDT&E All Up Rounds - FY18 SM-3 Manufacturing	MIPR	NAVSEA IWS : Washington DC	0.000	0.000		5.534	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
FY18 SM-3 Block IIA RDT&E All Up Rounds - FY18 SM-3 Block IIA RDT&E All Up Rounds - Raytheon	SS/CPAF	Raytheon : Tuscon, AZ	0.000	0.000		35.713	Jun 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		253.276		120.217		-		120.217	Continuing	Continuing	N/A
Remarks															
N/A															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency							Date: February 2018				
Appropriation/Budget Activity 0400 / 4			R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD				Project (Number/Name) MG09 / Aegis BMD SM-3 Development Articles				
	Prior Years	FY 2017	FY 2018		FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals	0.000	0.000	253.276		120.217	-	120.217	Continuing	Continuing	N/A	

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MG09 / Aegis BMD SM-3 Development Articles
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	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
FY16 SM-3 Block IIA AUR-first round delivery						◇															
FY16 SM-3 Block IIA AUR EPAA Phase III Declaration									◇												
FY18 SM-3 Block IIA AUR first round delivery															◇						

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MG09 / Aegis BMD SM-3 Development Articles

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FY16 SM-3 Block IIA AUR-first round delivery	3	2018	3	2018
FY16 SM-3 Block IIA AUR EPAA Phase III Declaration	1	2019	1	2019
FY18 SM-3 Block IIA AUR first round delivery	3	2021	3	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MM09 / Aegis BMD SM-3 Development
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MM09: <i>Aegis BMD SM-3 Development</i>	-	0.000	98.150	161.958	-	161.958	158.636	87.272	101.329	17.317	0.000	624.662
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Reflects transfer of SM-3 Development efforts from Project MD09, Aegis BMD in FY 2018

A. Mission Description and Budget Item Justification

Provides development of SM-3 Missiles, Upgrade Modifications, and Integration into the Aegis Weapon System. The SM-3 Block IB improves Aegis BMD's ability to expand the BMD battlespace, engage longer range, more sophisticated ballistic missiles that may deploy countermeasures and launch in larger raid sizes. The SM-3 Block IB Kinetic Warhead's (KW) two color infra-red (IR) seeker and advanced signal processor provides a real-time discrimination and characterization capability while improving sensitivity for longer range targets and performance against more sophisticated threats. Additionally, the new Throttleable Divert and Attitude Control System (TDACS) KW divert engine has been upgraded over the SM-3 Block IA to provide a more flexible divert in order to maneuver the KW to intercept.

The SM-3 Block IIA consists of an upgrade to a 21-inch diameter SM-3 missile and expands beyond the SM-3 Block IB battlespace to counter Intermediate Range Ballistic Missile (IRBM). SM-3 Block IIA provides an increased kinematic envelope through improved infa-red (IR) discrimination and divert capability that provide performance against the EPAA phase III expanded threat set. When combined with Aegis BMD 5.1 weapon system modifications, the SM-3 Block IIA will provide Engage on Remote (EoR) capability, which allows the use of remote off board sensor information to launch and guide the SM-3 Block IIA to final intercept. Aegis BMD 5.1 EoR capability with SM-3 Block IIA also frees up Radar resources and increases the number and type of threats to be engaged simultaneously over previous baselines.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Standard Missile-3 (SM-3) Block IB Development	0.000	21.148	49.259
Articles:	-	-	-
Description: This effort develops the SM-3 Block IB missile, which improves on the SM-3 Block IA performance and enables engagement of more sophisticated ballistic missiles and larger raid sizes. SM-3 Block IB Modernization will provide the following upgrades: - Upgraded SM-3 KW Common Avionics Package will provide improved producibility and reduced cost resulting from utilization of common components between SM-3 Block IIA and the Redesigned Kill Vehicle (RKV). SM-3 Block IB Common Components will be extendable to support different form/fit in circuit card assemblies across SM-3 Block IB, SM-3 Block IIA, and RKV and will mitigate SM-3 Block IB hardware availability issues.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018			
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MM09 / Aegis BMD SM-3 Development		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019	
<p>- Upgraded SM-3 Block IB Guidance Section (GS) will resolve Computer Processing Unit 3 and Plate 3A hardware availability issues, enable use of 5.1/IIA Target Object Map (TOM) and similar software to SM-3 Block IIA Mission Computer; and enable additional capability against complex threats.</p> <p>- Continue development of the upgraded SM-3 Block IB Guidance Section (GS)</p> <p>Recurring Accomplishments:</p> <p>- Assess performance with weapons systems upgrades/modifications and against emerging threats</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <p>Increase from FY 2017 to FY 2018 is reflects SM-3 Block IB Modernization efforts to develop capabilities against future threats, resolve identified hardware availability issues and increase commonality within the SM-3 Missile family. SM-3 Block IB Modernization consists of two primary upgrade packages as follows:</p> <p>- Initiate development of the upgraded SM-3 KW Common Avionics Package</p> <p>FY 2019 Plans:</p> <p>- Complete detailed design of the KW Common Avionics Package</p> <p>- Initiate development of common KW Circuit Card Assembly</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p> <p>Increase from FY 2018 to FY 2019 is reflects continued efforts for SM-3 Block IB Modernization efforts to develop capabilities against future threats, resolve identified hardware availability issues and increase commonality within the SM-3 Missile family with increased effort towards material acquisition of KW and GS.</p>					
Title: Standard Missile-3 (SM-3) Block IIA Development		0.000	77.002	112.699	
		Articles: -	-	-	
<p>Description: The SM-3 Block IIA is required to meet EPAA Phase III. It will increase the area that can be defended by Aegis BMD, increase the probability of kill against a larger threat set, and leverage enhanced capability provided by BMDS sensor upgrades.</p> <p>Recurring Accomplishments:</p> <p>- Conduct SM-3 Block IIA software update to support engagements against additional complex threats identified during Aegis BMD 5.1 design process conducted after missile Critical Design Review (CDR)</p> <p>- Conduct End to End Distributed Development System (ETEDDS) integration testing; and flight test support</p> <p>- Continue implementation of SM-3 Block IIA cost reduction initiatives to support meeting cost goals to reduce the current estimated Average Unit Production Price (AUPP)</p> <p>- Continue transition of KW hardware commonality effort (from design to material purchases) to system integration testing in order to demonstrate technology readiness level 7</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MM09 / Aegis BMD SM-3 Development
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>- Continue Engineering Manufacture Readiness Level (EMRL) 3 compliance to support life cycle progression Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Decrease from FY 2017 to FY 2018 reflects life cycle progression as program begins shift from development phase to initial production - Support execution of robust Flight Test Mission Campaign Series to ensure six successful SM-3 Block IIA Intercepts</p> <p>FY 2019 Plans: - Conduct Non-Recurring Engineering (NRE) services and materials to increase factory build and test capacity to sustain a rate capability of up to two SM-3 Block IIAs per month.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects transition of KW hardware commonality efforts.</p>			
Accomplishments/Planned Programs Subtotals	0.000	98.150	161.958

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Aegis BMD element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the SM-3 and the Aegis BMD Weapon System, respectively.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MM09 / Aegis BMD SM-3 Development
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09	SS/CPAF	Raytheon : Tuscon, AZ	0.000	0.000		17.598	Jan 2018	42.360	Dec 2018	-		42.360	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09 - 20117142332259	MIPR	NSWC/PHD : Port Hueneme, CA	0.000	0.000		1.934	Nov 2017	0.246	Nov 2018	-		0.246	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09 - Various	MIPR	NSWC Corona : Corona, CA	0.000	0.000		1.616	Nov 2017	0.343	Nov 2018	-		0.343	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09 DD	MIPR	NSWC Dahlgren : Dahlgren, VA	0.000	0.000		0.000		1.415	Nov 2018	-		1.415	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09 JHU/APL	SS/CPAF	JHUAPL : Laurel, MD	0.000	0.000		0.000		2.746	Nov 2018	-		2.746	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09-NAVSEA	MIPR	NAVSEA BAE Systems : Baltimore, MD	0.000	0.000		0.000		2.149	Nov 2018	-		2.149	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - CA,VA, MD	MIPR	Various : CA, VA, MD	0.000	0.000		3.338	Nov 2017	3.202	Nov 2018	-		3.202	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development -	SS/CPIF	Raytheon : Tuscon, AZ	0.000	0.000		52.738	Nov 2017	96.570	Apr 2019	-		96.570	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MM09 / Aegis BMD SM-3 Development
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA INTEGRATION															
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA INTEGRATION - APL	MIPR	JHU/APL : Laurel, MD	0.000	0.000		13.446	Nov 2017	6.514	Dec 2018	-		6.514	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA INTEGRATION - DD	MIPR	NSWC DD : Dahlgren, VA	0.000	0.000		5.053	Nov 2017	4.258	Nov 2018	-		4.258	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - NSWC Corona	MIPR	NSWC Corona : Corona, CA	0.000	0.000		1.266	Nov 2017	1.057	Nov 2018	-		1.057	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - NSWC/Crane	MIPR	NWSC/Crane : IN	0.000	0.000		1.161	Nov 2017	1.098	Nov 2018	-		1.098	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		98.150		161.958		-		161.958	Continuing	Continuing	N/A

Remarks
Increase from FY 2017 to FY 2018 (Raytheon, AZ) due to implementation of SM-3 IB Modernization

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	98.150	161.958	-	161.958	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MM09 / Aegis BMD SM-3 Development
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
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Remarks N/A									
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MM09 / Aegis BMD SM-3 Development
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	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
IMTP v19.1 flight and ground test event details are at a higher classification.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Kinetic Warhead hardware commonality (also known as Guidance Electronic Unit Engineering Change Proposal (GEU ECP)) CDR					◆																							
GEU ECP Host GEU delta-CDR											◆																	
GEU ECP Qualification															◆													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MM09 / Aegis BMD SM-3 Development
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023
Kinetic Warhead hardware commonality (also known as Guidance Electronic Unit Engineering Change Proposal (GEU ECP)) CDR	1	2018	1	2018
GEU ECP Host GEU delta-CDR	1	2019	1	2019
GEU ECP Qualification	1	2020	1	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD				Project (Number/Name) MC09 / Cyber Operations			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC09: <i>Cyber Operations</i>	2.925	2.301	2.340	10.886	-	10.886	13.718	16.238	10.274	11.164	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2018 to FY 2019 reflect the increasing cybersecurity requirements following the Secretary of Defense DoD Cybersecurity Discipline guidance to implement strong authentication, device hardening, reducing the attack surface and alignment to cybersecurity network defense services providers.

A. Mission Description and Budget Item Justification

Sustain the DoD RMF Certification and Accreditation process and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Systems Security Manager (PM/ISSM).

This project supports the monitoring and tracking of Cybersecurity mitigation detailed in Information Technology Security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Authorizing Official (AO). Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the AB mission and non-mission systems, which includes test and remote site administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Network / System Certification and Accreditation (C&A)	2.301	2.340	10.886
Articles:	-	-	-
<p>Description: This accomplishment has reoccurring efforts. Conduct cybersecurity engineering and architecture requirements planning or Aegis BMD systems. Plan and test the Risk Management Framework (RMF) controls for the BMDS in regards to Aegis BMD systems to comply with new directive, RMF for DoD Information Technology (DoDi 8510.01) to replace the DoD Information Assurance Certification and Accreditation process (DIACAP). In addition, conduct Controls Validation Testing (CVT). Recurring Accomplishments: - Continue coordination and development of new and existing accreditation packages that comply with new directive, RMF for DoD Information Technology (DoDi 8510.01) process - Conduct regular Controls Validation Testing (CVT) and cooperative risk assessments to mitigate cybersecurity deficiencies - Develop and deploy Hardware and Software HW/SW implementation strategies for Continuous Monitoring activities at remote sites and Aegis BMD assets Monthly reviews of systems through the eMass - Daily management of eMass System Plan of Action and Milestones (POAMs) Specific and/or unique accomplishments to each FY are as follows: - Daily management of eMass System Plan of Action and Milestones (POAMs)</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MC09 / Cyber Operations

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>FY 2018 Plans: Increase from FY 2017 to FY 2018 is attributed to increasing cybersecurity requirements and ensuring compliance of additional requirements. - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects steadily emerging and refined requirements.</p>			
Accomplishments/Planned Programs Subtotals	2.301	2.340	10.886

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: Ballistic Missile Defense Midcourse Defense Segment	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: Ballistic Missile Defense Sensors	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603896C: Ballistic Missile Defense Command and Control, Battle Management & Communication	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603898C: Ballistic Missile Defense Joint Warfighter Support	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing
• 0603904C: Missile Defense Integration and Operations Center (MDIOC)	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0604878C: Aegis BMD Test	131.012	137.783	95.756	-	95.756	80.684	94.138	146.910	137.601	Continuing	Continuing
• 0604880C: Land Based SM-3 (LBSM3)	40.452	30.486	27.692	-	27.692	29.263	28.370	27.228	28.225	Continuing	Continuing
• 0604881C: AEGIS SM-3 Block IIA Co-Development	102.272	9.739	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	112.011

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MC09 / Cyber Operations
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0901598C: <i>Management HQ - MDA</i>	30.693	29.947	28.626	-	28.626	27.276	27.894	28.466	29.005	Continuing	Continuing

Remarks

D. Acquisition Strategy

Full and Open contract support through Missile Defense Agency Program Management Office.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MC09 / Cyber Operations
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network / System Certification and Accreditation (C&A) - BOOZ ALLEN HAMILTON INC	C/CPIF	MDA : MCLEAN, VA	1.729	1.747	Oct 2016	2.340	Nov 2017	4.059	Nov 2018	-		4.059	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - CND/IA Advisory and Assistance Services	C/CPIF	Torch Technologies : Huntsville, AL	1.196	0.554	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Network System Certification and Accreditation	SS/CPAF	Lockheed Martin : Moorestown NJ	0.000	0.000		0.000		6.827	Nov 2018	-		6.827	Continuing	Continuing	Continuing
Subtotal			2.925	2.301		2.340		10.886		-		10.886	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.925	2.301	2.340	10.886	-	10.886	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date: February 2018**

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / <i>AEGIS BMD</i>	Project (Number/Name) MC09 / <i>Cyber Operations</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆			
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇			
MC09 Cyber Operations	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MC09 / Cyber Operations
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC09 Cyber Operations	1	2017	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD				Project (Number/Name) MX09 / Aegis BMD Development Support			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MX09: <i>Aegis BMD Development Support</i>	115.328	74.920	173.325	185.742	-	185.742	182.219	183.780	194.068	194.217	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Aegis Ballistic Missile Defense (BMD), in accordance with negotiated agreements between the U.S. Navy and the Missile Defense Agency (MDA) has identified and segregated funding for Developmental Support of Aegis BMD specific elements resident aboard Aegis capable U.S. Navy ships. Computer Program Support consists of, but is not limited to, reviews of Technical Observation Reports (TORs) that are generated by ship crews during exercises or deployments, determination of root causes and preparation of Computer Program Change Request (CPCR) to correct TORs, updates to the in-service computer program to apply, test and certify multiple CPCRs, and tests installation of Aegis Weapon System (AN/SPY-radar/Fire Control System (FCS)) alignment updates as required. Aegis BMD provides support to Annual Integration Events (AIEs) to ensure any updated Aegis Combat System (ACS) computer programs do not degrade BMD equipped ships and provides distance and technical support for BMD equipped ships.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Fleet Integration	9.921	9.257	15.395
Articles:	-	-	-
<p>Description: Provide Fleet operations and mission support to enable the conduct of sustained BMD operations; advocate war fighter requirements and fleet feedback in baseline development and capability upgrades to Aegis BMD weapon system; provide analysis and Mission Planning support for Geographic Combatant Commanders for operational application of Maritime BMD capabilities; and provide BMD Capabilities Analysis and Exercise Support for Aegis BMD baselines under development or currently deployed in the Operational Fleet.</p> <p>Recurring Accomplishments:</p> <ul style="list-style-type: none"> - Define, develop and review Joint and Fleet Doctrine for incorporation of Aegis BMD capability transition to warfighter and baseline acceptance into MDA Operational Capacity Baseline (OCB) - Research and define certification and warfighter acceptance requirements for Aegis BMD baselines to ensure successful capability delivery - Develop Aegis BMD training simulations and scenarios to support shipboard training including BMD Qualification (BMDQ) and higher level exercises - Execute warfighter feedback process to enhance Aegis BMD functional capability development and influence future Aegis BMD requirements and support MDA Test Community and Combatant Commanders in BMD Exercises and Wargames 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4		R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD		Project (Number/Name) MX09 / Aegis BMD Development Support
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Provide analysis for Anti-Ship Ballistic Missile Defense - Provide analysis on parametric organic sensor sensitivity - Provide analysis on up-range ship/sensor support for LoR, EoR, and Cued engagements - Provide analysis on impacts of countermeasures - Provide analysis on developing threats <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Increase from FY 2017 to FY 2018 reflects COCOM operational analysis to support and inform both regional and homeland defense design implementation for Aegis BMD ship capability.</p> <p>FY 2019 Plans: - Optimization of multi-baseline/ship defense designs - Limited anti-air warfare depth of fire calculations - Real-time mission planning for COCOMs and fleet components to facilitate regional defense design laydowns</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects increased scope and complexity of COCOM operational analysis requirements to support and inform both regional and homeland defense design implementation for Aegis BMD ship capability.</p>				
Title: Infrastructure Upgrades		20.439	20.866	25.297
		Articles:	-	-
<p>Description: This project includes Special Access Program (SAP) infrastructure labor to include Contractor Program Security Officers, Information Assurance Officers, and System Administrators that will oversee the data transfer efforts. Funds IT services in support of the Aegis RDT&E mission. This includes: IT help-desk services; portal and data services; records management; business automation services; and desktop and Special Purpose Processing Nodes (SPPNs) maintenance and licenses. In addition, funds will be used to replace critical IT infrastructure at end-of-life and to implement DoD mandated projects in support of the Joint Information Environment (JIE) initiative.</p> <p>Recurring Accomplishments:</p> <ul style="list-style-type: none"> - Transfer necessary data between collateral and SAP environments to comply with Federal and DoD mandates (Cybersecurity and Joint Information Environment) - Configuration and data management to ensure Modeling and Simulation (M&S) and software builds are identical in collateral and SAP environment - Fund Aegis IT services such as IT help-desk services; portal and data services; records management; business automation services; and desktop and SPPN maintenance and licenses. - Fund critical end-of-life IT equipment replacements 				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018		FY 2019
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- Fund IT infrastructure upgrade planning and implementation efforts to accomplish DoD mandated IT projects (JIE and DoD CIO Information Resources Management (IRM) initiatives)
 - Implement and manage C4I aspects of the BMDS Test Site (BTS) San Diego upgrade plan to maintain fleet representative C4I configurations to support testing, troubleshooting, and Fleet operations
 Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:

- Provide standard IT core user services in support of the Aegis BMD RDT&E mission as follows:
- IT core services encompassing end user services including the Microsoft productivity suite including Microsoft Word, Excel, PowerPoint, Access and Lync
- Public Key Enabling software such as Active Identity client software which enables secure workstations with smart cards to enforce strong authentication for network security
- IT help-desk services, IT consumables, hardware break-fix, end-of-life equipment replacements and IT asset management. Access to the MDA business applications and portal services such as SharePoint for data management services and records management. It includes Unified Communications services such as telephony, wireless services and Video Conferencing capabilities
- Provide security support, network administration, performance monitoring, and technical support for SAP infrastructures and computing suites

FY 2019 Plans:

- SEE ABOVE.

FY 2018 to FY 2019 Increase/Decrease Statement:

Increase from FY 2018 to FY 2019 reflects an expanding data management and M&S software builds in collateral and SAP environment. Reflects transfer of BTS upgrade effort from MD09.

Title: Aegis Ballistic Weapon System Support	44.560	34.999		37.613
Articles:	-	-		-

Description: This project provides system engineering for fielded Aegis BMD Weapon Systems from warfighter feedback, investigation of BMDS Discrepancy Reports, and BMDS ground test observation analysis. It includes computer program defect corrections and supports assessment of flight test readiness.

Recurring Accomplishments:

- Monitor and address Fleet feedback concerns raised during waterfront technical exchanges and ship visits
- Update threat adaptation data to keep pace with emergent threats
- Provide operation and maintenance of land based test sites used for the development of Aegis BMD baselines. Operation and maintenance includes Quality Assurance, Configuration Management and other support activities to both baseline development

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018		FY 2019
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and the sites. Engineering, logistic, quality assurance, configuration management and administrative support for the operation and maintenance of the Aegis shore sites and centers in support of the delivery of BMD baselines

- Provide support for contingency operations of National interest
- Support the fielded Aegis BMD computer programs baselines approved as an Operational Capability Baseline
- Provide engineering support to Operationally Capable Baseline ships that participate in BMD test events
- Perform system troubleshooting and maintenance as required for Aegis BMD related systems
- Provide preventative and corrective maintenance services and upgrades in support of Aegis BMD systems and associated support systems
- Provide test site usage for maintenance and support of baselines under development
- Sustain the classified computing infrastructure

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:
Increase from FY 2017 to FY 2018 is due to completion of BMD 5.x efforts

FY 2019 Plans:
- SEE ABOVE.

FY 2018 to FY 2019 Increase/Decrease Statement:
Increase from FY 2018 to FY 2019 stems from the need to increase threat adaptation data updates from annual to semi-annual. Increased periodicity required to maintain pace with new threats and the rapid evolution of existing threats. Funding increase also provides support to maintain the classified Modeling and Simulation infrastructure required to support accelerated threat adaption data updates to Aegis BMD Ships and Sites.

Title: Program Operations	0.000	104.203		104.737
Articles:	-	-		-

Description: This activity funds the Government, contractor, and Federally Funded Research and Development Center (FFRDC) workforce that manage the overall Aegis Ballistic Missile Defense (BMD) program and enables the program to develop, build, and test standard missiles and the associated Aegis Weapon Systems. This project includes all operations support for the Aegis program office in Engineering, Testing, Logistics, Acquisition, Safety, Quality Assurance, Finance, Budget Formulation and Execution, Cost Estimation, and Earned Value Management in support of development activities.

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Reflects transfer of Program Operations from Project MD09, Aegis BMD. Decrease from FY 2017 to FY 2018 reflects cost savings attained through consolidation of contractor tasks and efforts performed in support of the Aegis program. FY 2019 Plans: - SEE ABOVE. FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Title: United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) Description: Integrated upper tier Ballistic Missile Defense System that expands engagement options and increases coverage area. Provides updated Threat Adaptation Data necessary for successful mission planning and threat detection on Aegis BMD ships. JEON funding also supports initial development efforts for regional peer-to-peer engagement coordination with Terminal High-Altitude Area Defense (THADD). FY 2018 Plans: Provide updated Threat Adaptation Data necessary for successful mission planning and threat detection on Aegis BMD ships. JEON funding also supports initial development efforts for regional peer-to-peer engagement coordination with Terminal High-Altitude Area Defense (THAAD). FY 2019 Plans: Deliver an integrated upper tier Ballistic Missile Defense System that expands engagement options and increases coverage area. FY 2018 to FY 2019 Increase/Decrease Statement: New Accomplishment	0.000 -	4.000 -	2.700 -
Articles:			
Accomplishments/Planned Programs Subtotals	74.920	173.325	185.742

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0604878C: Aegis BMD Test	131.012	137.783	95.756	-	95.756	80.684	94.138	146.910	137.601	Continuing	Continuing
• 0604880C: Land Based SM-3 (LBSM3)	40.452	30.486	27.692	-	27.692	29.263	28.370	27.228	28.225	Continuing	Continuing
• 0604881C: AEGIS SM-3 Block IIA Co-Development	102.272	9.739	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	112.011

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

The Aegis Ballistic Missile Defense (BMD) element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the Standard Missile-3 (SM-3) and the Aegis BMD Weapon System, respectively.

Competition will be maximized for purchase of any products or services as appropriate.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Fleet Integration - MX09 - Fleet APL	C/CPAF	JHU/APL/MD : Columbia, MD	6.192	6.558	Nov 2016	4.746	Nov 2017	8.085	Nov 2018	-		8.085	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet DD	MIPR	NSWC DD : Dahlgren, VA	2.913	1.873	Nov 2016	2.979	Nov 2017	2.938	Nov 2018	-		2.938	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet PHD	MIPR	NSWC PHD : Port Huenemene	0.432	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet SMDC	MIPR	SMDC/ARSTRST : Huntsville, AL	0.369	0.468	Nov 2016	0.468	Nov 2017	0.639	Nov 2018	-		0.639	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet CSCS	MIPR	CSCS : Dahlgren, VA	1.074	1.022	Nov 2016	1.064	Nov 2017	1.053	Nov 2018	-		1.053	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet System Engineering Group	C/CPFF	System Engineering Group : Laurel, MD	0.000	0.000		0.000		2.680	Nov 2018	-		2.680	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - ICT Funding	C/CPAF	Northrop Grumman / Jacobs Engineering : AL, CA, CO, NM, VA, HI	11.832	9.771	Oct 2016	13.282	Nov 2017	12.911	Nov 2018	-		12.911	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S APL	SS/CPAF	JHU/APL : Laurel, MD	0.400	0.650	Nov 2016	0.700	Nov 2017	3.663	Nov 2018	-		3.663	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S Corona	MIPR	NSWC Corona : Corona, CA	0.630	1.000	Nov 2016	1.000	Nov 2017	1.418	Nov 2018	-		1.418	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S LM	C/CPAF	Lockheed Martin : Moorestown, NJ	8.828	2.410	Nov 2016	2.356	Nov 2017	2.645	Nov 2018	-		2.645	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S MIT	C/CPAF	MIT : Lexington, MA	0.120	0.200	Nov 2016	0.200	Nov 2017	0.348	Nov 2018	-		0.348	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S RMS	C/CPAF	Raytheon : Tucson, AZ	3.720	2.100	Nov 2016	2.100	Nov 2017	1.100	Nov 2018	-		1.100	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - D/TD	MIPR	SPAWAR : CA	0.000	3.598	Nov 2016	0.426	Nov 2017	2.092	Nov 2018	-		2.092	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S DD	MIPR	NSWC DD : Dahlgren, VA	1.609	0.710	Nov 2016	0.802	Nov 2017	0.300	Nov 2018	-		0.300	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - Various	MIPR	Various : Various	0.000	0.000		0.000		0.820	Nov 2018	-		0.820	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Aegis Ballistic Weapon System Support - MX09 - AW APL	SS/CPFF	JHU/APL : Columbia, MD	3.790	0.892	Nov 2016	1.052	Nov 2017	1.182	Nov 2018	-		1.182	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW DD	MIPR	NSWC DD : Dahlgren, VA	13.991	4.060	Nov 2016	3.277	Nov 2017	3.946	Nov 2018	-		3.946	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW LM	C/CPFF	Lockheed Martin : Moorestown, NJ	22.740	8.139	Nov 2016	4.739	Nov 2017	8.373	Nov 2018	-		8.373	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW NAVSEA	MIPR	NAVSEA : Washington, DC	13.643	18.502	Nov 2016	18.644	Nov 2017	22.450	Nov 2018	-		22.450	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW SSCPAC	MIPR	SPAWAR : San Diego, CA	2.390	0.000		1.520	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW TECH REP	MIPR	Aegis Tech Rep : Moorestown, NJ	0.600	0.249	Nov 2016	0.358	Nov 2017	0.432	Nov 2018	-		0.432	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW Wallops	MIPR	SCSC : Wallops Island, VA	2.000	0.000		0.310	Nov 2017	0.374	Nov 2018	-		0.374	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - D	MIPR	MDA : Arlington, VA	1.037	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - IH	MIPR	NSWC Indian Head : MD	0.249	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - Raytheon	SS/CPAF	Raytheon : AZ	5.644	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD JHU/APL	SS/CPFF	JHU/APL : Columbia, MD	0.750	1.804	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Aegis Ballistic Weapon System Support - MX09 - TD MITRE	MIPR	CECOM - MITRE : Dahlgren, VA	0.900	1.100		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD NSWC DD	MIPR	NSWC DD : Dahlgren, VA	0.820	1.013	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD PHD	MIPR	NSWC PHD : Port Hueneme, CA	0.250	0.307	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD SSCPAC	MIPR	SPAWAR : San Diego, CA	3.903	7.923		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD Various	MIPR	Various : San Diego, CA	4.002	0.571	Nov 2016	4.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW PHD	MIPR	NSWC PHD : Port Hueneme, CA	0.500	0.000		0.713	Nov 2017	0.856	Nov 2018	-		0.856	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW MIT/LL	MIPR	Hanscom, AFB : Lexington, MA	0.000	0.000		0.036	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW Various	MIPR	Various : MD, VA	0.000	0.000		0.350	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - Civ Sal	MIPR	MDA : Arlington, VA	0.000	0.000		35.358	Nov 2017	35.750	Nov 2018	-		35.750	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - DD PM	MIPR	NSWC DD : Dahlgren, VA	0.000	0.000		4.932	Nov 2017	3.186	Nov 2018	-		3.186	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - IT	MIPR	MDA : Arlington, VA	0.000	0.000		1.402	Nov 2017	1.752	Nov 2018	-		1.752	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Operations - Program Operations - MD09 - MDA Travel	MIPR	MDA : Arlington, VA	0.000	0.000		2.165	Nov 2017	3.958	Nov 2018	-		3.958	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - MIDAESS	MIPR	MDA : Arlington, VA	0.000	0.000		40.197	Nov 2017	38.448	Nov 2018	-		38.448	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - NAVSEA Civ Sal	MIPR	NAVSEA : Washington, DC	0.000	0.000		13.691	Nov 2017	15.466	Nov 2018	-		15.466	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - NAVSEA RB Sal	MIPR	NAVSEA : Washington, DC	0.000	0.000		2.225	Nov 2017	2.499	Nov 2018	-		2.499	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - NAVSEA Training, Various	MIPR	NAVSEA : Washington, DC	0.000	0.000		1.526	Nov 2017	0.297	Nov 2018	-		0.297	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - NAVSEA Travel	MIPR	NAVSEA : Washington, DC	0.000	0.000		1.056	Nov 2017	0.659	Nov 2018	-		0.659	Continuing	Continuing	Continuing
Program Operations - Program Operations - MD09 - Security	MIPR	Various VA : VA	0.000	0.000		1.651	Nov 2017	2.722	Nov 2018	-		2.722	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK) - MX09 AW JHU/APL	SS/CPFF	JHU/APL : Columbia, MD	0.000	0.000		0.753	Apr 2018	0.000		-		0.000	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK) - MX09 AW Lockheed Martin	C/CPFF	Lockheed Martin : Moorestown, NJ	0.000	0.000		1.157	Apr 2018	0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK) - MX09 AW MIT/LL	MIPR	MIT/LL : Lexington, MA	0.000	0.000		0.427	Apr 2018	0.000		-		0.000	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK) - MX09 AW NSW	MIPR	NSWC DD : Dahlgren, VA	0.000	0.000		1.095	Apr 2018	0.000		-		0.000	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK) - MX09 AW Various	MIPR	Various : Various	0.000	0.000		0.568	Apr 2018	0.000		-		0.000	Continuing	Continuing	Continuing
United States Forces Korea (USFK) Joint Emergent Operational Needs Statement (JEONS) - United States Forces Korea (USFK)-AW	SS/CPAF	LM : LM	0.000	0.000		0.000		2.700	Nov 2018	-		2.700	Continuing	Continuing	Continuing
Subtotal			115.328	74.920		173.325		185.742		-		185.742	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	115.328	74.920	173.325	185.742	-	185.742	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
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Remarks N/A									
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆							
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇							
					FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
MX09 Aegis BMD Development Support					◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MX09 / Aegis BMD Development Support

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MX09 Aegis BMD Development Support	1	2017	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD				Project (Number/Name) MD40 / Program-Wide Support			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	231.934	41.057	41.634	35.050	-	35.050	33.485	28.218	30.794	30.702	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) reflects proportional changes as a result of budget changes in the BMD Aegis program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	41.057	41.634	35.050
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	41.057	41.634	35.050

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD40 / Program-Wide Support
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C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

NA

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD40 / Program-Wide Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Facilities and Maintenance SRM (MIPR)	MIPR	Various : Multi: AL, CO, CA, VA, AK	0.174	1.220	Jan 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	1.552	0.334		0.833	Jul 2018	0.537	Jul 2019	-		0.537	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	C/CPAF	Various/Multi: AL, CA, CO, : NM, VA, various	0.623	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries	Allot	MDA : Multi: AK, AL, CO, CA, VA	162.915	36.160	Nov 2016	37.906	Nov 2017	34.513		-		34.513	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various : Multi: AK/AL/CA/CO/HI/MD/VA/NJ/NY/OCONUS	30.979	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	33.267	3.094	Aug 2017	2.895	Aug 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and materiel and Readiness	MIPR	Naval Surface Warfare Center : AL, VA	1.367	0.249	Mar 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	MIPR	Various : Multi: AL, CA, CO, VA	1.057	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			231.934	41.057		41.634		35.050		-		35.050	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	231.934	41.057	41.634	35.050	-	35.050	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / <i>AEGIS BMD</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
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Remarks N/A									
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD40 / Program-Wide Support
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 10%;">FY 2017</th> <th style="width: 10%;">FY 2018</th> <th style="width: 10%;">FY 2019</th> <th style="width: 10%;">FY 2020</th> <th style="width: 10%;">FY 2021</th> <th style="width: 10%;">FY 2022</th> <th style="width: 10%;">FY 2023</th> </tr> </thead> <tbody> <tr> <td>MD40 Program-Wide Support</td> <td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td> </tr> </tbody> </table>						FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / AEGIS BMD	Project (Number/Name) MD40 / Program-Wide Support
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	728.187	37.809	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MD12: <i>Space Tracking and Surveillance System (STSS)</i>	719.397	36.452	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	8.790	1.357	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond was transferred to PE 1206893C to aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security.

A. Mission Description and Budget Item Justification

The two Space Tracking and Surveillance System (STSS) satellites launched in 2009 provide an on-orbit capability to validate remote sensor fire control integration to inform design and operation of future Missile Defense Agency (MDA) space-layer capabilities. MDA uses STSS data to characterize contribution of space data into the BMDS and to provide sensor measurements and background data supporting trade studies and analyses for future MDA space-layer options for both Homeland and Regional Defense.

STSS continues to provide risk reduction for future MDA space capabilities, models, algorithms, interface definitions, communications architectures, and performance across threat object acquisition, tracking, complex target signatures, discrimination and multi-mission support. STSS also informs the Ballistic Missile Defense System (BMDS) Concept of Operations, timelines and performance requirements for remote space sensor cuing for ballistic missile engagements, expanding battle space for weapon systems such as Aegis BMD.

The STSS program demonstrates the functions and interfaces required for space data delivery to the BMDS, validating the data quality necessary for interceptors to launch and/or engage on STSS sensor data. The two STSS satellites are operated from the ground station processing center at the Missile Defense Space Center (MDSC). The STSS satellites demonstrate MDA space-layer capabilities and reduce risk for future systems by viewing high-value Targets of Opportunity and participating in BMDS flight tests.

The MDSC provides MDA's only centralized collaboration and integration environment that leverages existing Overhead Persistent Infrared (OPIR) enterprise integration in support of BMDS research and development test, and sensor operations. The MDSC capabilities and infrastructure support flight tests, operational concept and prototype development, technology demonstrations, experiments, and algorithm development within a multi-security, collaborative environment to integrate and exploit national space asset data. The MDSC also conducts studies and experiments with MDA assets such as the Spacebased Kill Assessment (SKA), and STSS, as well as other agencies' assets.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	32.129	0.000	0.000	-	0.000
Current President's Budget	37.809	0.000	0.000	-	0.000
Total Adjustments	5.680	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	6.426	0.000			
• SBIR/STTR Transfer	-0.746	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603893C is transferred to PE 1206893C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security.

Increase to support development of Tactical Real Time Missile Warning and studies and analysis for future space concepts to address Sec. 1687 of 2017 NDAA.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>			Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD12: <i>Space Tracking and Surveillance System (STSS)</i>	719.397	36.452	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603893C is transferred to PE 1206893C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security.

A. Mission Description and Budget Item Justification

Two Space Tracking and Surveillance System (STSS) satellites provide a low earth orbit sensor capability with visible and infrared sensors for integrated testing with other BMDS elements. STSS demonstrates space-based capabilities including persistent tracking and integrated BMDS discrimination improvements. These two satellites provide valuable risk reduction for acquisition, tracking, complex scenes, and discrimination functionality to include stereo data fusion, cueing radars over the horizon and over-the-horizon fire control.

The on-orbit sensors collect invaluable background, scene and target signatures to support future MDA space-layer and other weapon sensor development trade studies. STSS activities provide information for integration of space-based missile tracking (midcourse phase); remote sensor and weapons cueing via the Command and Control, Battle Management and Communications (C2BMC); features and discrimination; and hit/impact point assessments. STSS enables early capability assessment to address the Warfighter's need for highly available early missile tracking from space, providing an operationally suitable means of global persistent surveillance and engagement. Capabilities being assessed for future MDA space-layer capabilities include detecting and acquiring ballistic missiles; tracking ballistic missiles and their deployed objects; performing autonomous acquisition-to-track handover within a satellite; performing tracking handover to a satellite from a ground cue; performing uplink and downlink of mission, health, and status data both directly and via crosslink between two satellites; reporting ballistic missile and intercept event to close the fire-control loop; filtering reports to C2BMC; and providing near real-time object data to external users. STSS support to other mission areas improves definition for future Enterprise system approaches.

The Missile Defense Space Center (MDSC) provides capabilities and infrastructure to support space operations, integration and testing with the BMDS. It provides a multi-level security environment for sensor data management and integration across space and terrestrial sensor data activities. MDSC experiments leverage DoD and national security space capabilities. MDSC activities support analysis, demonstration and integration of space sensor capabilities into developmental and operational MDA elements. MDSC enables the development of advanced technology and algorithms including fusion of multiple sensor types (radar, overhead persistent infrared, electro-optical and other emerging sensor technologies). It also supports mission integration of space-based missile tracking, sensor and weapons cueing via C2BMC, features and discrimination, kill and impact point assessments into the BMDS and other non-MDA mission areas, including Space Situational Awareness, technical intelligence, and battle space characterization. This effort is a continuation of work previously performed in program element 0603895C that supported the STSS program.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

Lessons learned and data gathered from the STSS demonstration satellites program provide valuable information for future MDA space-layer modeling and simulation activities in assessing the capability provided by Overhead Persistent Infrared sensors.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Demonstration Satellites	36.452	0.000	0.000
Articles:	-	-	-
<p>Description: The Space Tracking and Surveillance System (STSS) demonstration satellites collect and deliver critical space and missile characterization data used to design and inform the BMDS and space-layer future capabilities. The Missile Defense Space Center (MDSC) facilities and activities are required for safe STSS satellite operations and sustainment</p> <p>STSS activities include:</p> <ul style="list-style-type: none"> - Perform risk reduction for future MDA tracking and surveillance initiatives and Overhead Persistent Infra-red (OPIR) Enterprise integration and demonstrations across OPIR cueing, Joint Tasking Operations, and data utility - Collect data to support joint OPIR mission utility assessments across Space Situational Awareness, Battle Space Awareness, and Technical Intelligence missions to include integration, analysis, and studies to confirm data sharing capabilities - Participate in Integrated Master Test Plan events - Conduct satellite testing to demonstrate critical space capabilities, including: <ul style="list-style-type: none"> -- Ability to support BMDS integrated discrimination efforts -- Ability to support Hit/Kill assessment from space -- Ability to cue BMDS sensors from space -- Ability to provide precision cue to BMDS sensors - Perform satellite functionality testing and calibration as part of the satellite operations - Conduct missile tracking experiments as identified in the test specific sections - Provide Air Force Space Command Space Situational Awareness support <p>MDSC efforts related to STSS include:</p> <ul style="list-style-type: none"> - Analyze space radiation environment and its influence on MDA space system performance - Analyze space based sensor data from STSS and OPIR observations, both individually and combined, to identify phenomenology and techniques to aid future tracking and discrimination architectures - Provide data for concept studies and analysis for alternative sensor payload configurations - Sustain MDSC resources for all participant activities, including data, voice, and/or video communications, and support MDA Cyber Security directives - Document requirements and perform tracking, design, implementation, and verification necessary for the MDSC facility - Implement emerging cyber security requirements 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans: In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603893C is transferred to PE 1206893C.			
FY 2019 Plans: In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603893C is transferred to PE 1206893C.			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	36.452	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	20.910	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

The Space Tracking and Surveillance System (STSS) demonstration satellites program follows MDAs capability-based acquisition strategy that emphasizes testing, incremental development, and evolutionary acquisition. The STSS effort utilizes a single prime contractor, Northrop Grumman Aerospace Systems (NGAS), formerly known as Northrop Grumman Space Technology (NGST), with the subcontractor Raytheon providing the sensor payload. This contract implements MDA's capability-based acquisition strategy by using existing satellite hardware as a low risk opportunity, building upon the lessons learned from previous development efforts, and establishing a series of planned enhancements to bring added capability to the BMDS.

Functions and operations of the Missile Defense Space Center (MDSC) were financed through a 10-year MDSC Joint National Integration Center Research and Development Contract Services Contract (JRDC). The sole-source contractor, Northrop Grumman Information Systems, was responsible for integrating Research, Development, Test and Evaluation, operations support, and resource and infrastructure management for the MDSC, providing customer support, while achieving efficiencies through approaches that meet or exceed customer requirements. This contract concludes in FY17.

Follow-on MDSC efforts will be acquired on the Integrated Research and Development for Enterprise Solutions (IRES) contract vehicle. This contract is responsible for integrating Research, Development, Test and Evaluation, operations support, resource and infrastructure management for the MDSC. Through various uses of incentives upon the requirement objectives, the contractor provides customer support while striving to achieve efficiencies through approaches that meet or exceed customer requirements.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Demonstration Satellites - Capability Based R&D	SS/CPAF	NGAS : Redondo Beach, CA, Schriever AFB, CO	585.640	19.254	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration Satellites - STSS Support to Missile Defense Space Center (MDSC)	SS/CPAF	NGIS/TBD : Schriever AFB, CO	21.248	3.360	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration Satellites - Systems Engineering	FFRDC	Aerospace : Los Angeles CA, Schriever AFB CO	52.680	0.692	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			659.568	23.306		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
 Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.
 All efforts listed above will continue in PE 1206893C, project MD12

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Demonstration Satellites - Contract Support Services (CSS)	C/Variou	MDA : AL, CO	22.046	3.866	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration Satellites - FFRDC - MITRE	C/CPFF	MITRE : CO	0.000	0.363	Feb 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration Satellites - FFRDC - Sandia	C/CPFF	Sandia National Lab : NM	0.000	0.420	Feb 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration Satellites - Future Capability	MIPR	Various : Various	0.000	3.996	Sep 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Demonstration Satellites - IT User Services	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	1.047	0.420	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration Satellites - MDA Civilian	Allot	MDA : Schriever AFB, CO	12.870	2.339	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration Satellites - Other Government Agency (OGA) Civilian	MIPR	SMC : Schriever AFB, CO	11.861	0.160	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration Satellites - Program Mission Support	Various	Various : Various	11.274	0.383	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration Satellites - UARC - APL	C/CPFF	JHU/APL : MD	0.000	0.600	Feb 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Demonstration Satellites - UARC - SDL	C/CPFF	Utah University, Space Dynamics Lab : AL, AK, CA, CO, HI, MA, UT, VA	0.731	0.599	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			59.829	13.146		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
 Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.
 All efforts listed above will continue in PE 1206893C, project MD12

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	719.397	36.452	0.000	0.000	-	0.000	Continuing	Continuing	N/A

Remarks
 Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>
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	Significant Event Complete ▲ Significant Event Planned △	Milestone Decision Complete ★ Milestone Decision Planned ☆	Element Test Complete ◆ Element Test Planned ◇	System Level Test Complete ● System Level Test Planned ○				Complete Activity ◆ Planned Activity ◇										
				FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023								
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2017	△																	
STSS Demonstration Satellites On-Orbit Operations - 1Q2017-4Q2017	◇	◇	◇	◇														
MIS Operations - 1Q2017-4Q2017	◇	◇	◇	◇														
Mission Planning, Tasking and Analysis - 1Q2017-4Q2017	◇	◇	◇	◇														
MDSC TIL Operations - 1Q2017-4Q2017	◇	◇	◇	◇														
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2017		△																
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2017			△															
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2017				△														

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2017	1	2017	1	2017
STSS Demonstration Satellites On-Orbit Operations - 1Q2017-4Q2017	1	2017	4	2017
MIS Operations - 1Q2017-4Q2017	1	2017	4	2017
Mission Planning, Tasking and Analysis - 1Q2017-4Q2017	1	2017	4	2017
MDSC TIL Operations - 1Q2017-4Q2017	1	2017	4	2017
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2017	2	2017	2	2017
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2017	3	2017	3	2017
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2017	4	2017	4	2017

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	8.790	1.357	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2017 Program Wide Support reflects proportional changes as a result of decreases to the Space Tracking and Surveillance System program. Beginning in FY 2018, Program Wide Support was proportionately reallocated as a result of the Space Tracking and Surveillance System 0603293C transfer to Space Tracking and Surveillance System 1206893C program element.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	1.357	0.000	0.000
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	1.357	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO,	0.585	0.009	Jul 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various : Multi: AK/AL/CO/CA/HI/MD/VA/NJ/NY/OCONUS	1.062	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Northrop Grumman : CO	7.143	1.348	Aug 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			8.790	1.357		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	8.790	1.357	0.000	0.000	-	0.000	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆							
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇							
					FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
MD40 Program-Wide Support					◇	◇	◇	◇			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603893C / <i>Space Tracking and Surveillance System</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2017

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	26.084	20.910	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MD33: <i>MD Space Exp Center (MDSEC)</i>	24.119	19.989	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	1.965	0.921	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond was transferred to PE 1206893C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security.

A. Mission Description and Budget Item Justification

This program element primarily funds the Spacebased Kill Assessment (SKA) project, a Missile Defense Agency (MDA) experiment to demonstrate kill assessment from space. MDA experience with intercept testing on the Aegis BMD program provided solid understanding of the physics of kill assessment.

Several events set the stage for the kill assessment experiment that later became known as SKA:

- Section 237 in the FY 2014 National Defense Authorization Act directed MDA to improve kill assessment for the GMD program with an initial kill assessment capability by December 31, 2019
- An MDA study called the Space Layer Option Study found that disaggregated systems could provide sensor capabilities at lower costs
- A once in a decade opportunity became available when the commercial sector offered hosted payload services at costs far below what MDA could expect if it used traditional DOD space acquisition models

One feature of the SKA acquisition plays a crucial role in the execution of the experiment: schedule discipline. Since MDA cannot impact the schedule of the commercial host, maintaining schedule pace is priority #1 on the program. If SKA payloads are delivered late to the commercial host, they miss their opportunity to be launched into space.

SKA incorporates Government Accountability Office (GAO) recommendations to examine the operational feasibility of disaggregating large satellites (report number GAO-15-7) and to provide data for the business case for shared or dedicated satellite control, including the ground antenna networks (report number GAO-13-315). The SKA experiment will utilize a network of small IR sensors integrated onto commercial host satellites which, while on orbit, will observe missile defense intercepts and deliver a kill assessment declaration to the BMDS. SKA has the opportunity to change the economics of the defense of the American homeland from enemy ballistic missiles.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>
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This program element also funds engineering trade studies and concept evaluations for current and future space based sensors.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	20.690	0.000	0.000	-	0.000
Current President's Budget	20.910	0.000	0.000	-	0.000
Total Adjustments	0.220	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.699	0.000			
• SBIR/STTR Transfer	-0.479	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond was transferred to PE 1206895C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>				Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD33: <i>MD Space Exp Center (MDSEC)</i>	24.119	19.989	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603895C is transferred to PE 1206895C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security.

A. Mission Description and Budget Item Justification

The SKA system is composed of two segments: a space segment and a ground segment.

- The space segment is composed of a network of small infrared (IR) sensors (sensors, processor cards and cabling), each mated to a different satellite. The total number of sensors and where they are placed in the network are specifically tailored for the kill assessment mission. The space segment includes key design features to improve its resiliency.

- The ground segment is a small network of desktop computers, servers and routers that monitor the health of the on-orbit sensors, command the sensors to perform the kill assessment mission and analyze the data to make a kill assessment determination for the BMDS. The ground segment also includes the equipment necessary for communications security and information assurance. The Missile Defense Space Center (MDSC) is the communications hub for SKA data, routing SKA data between the commercial payload integrator and the SKA Payload Analysis Center.

The SKA sensors are hosted on satellites that are not developed by MDA, thus schedule performance is the highest priority of the experiment. Since the launch of the host satellites will not wait for hosted payloads that are delivered late, the management of the SKA project focuses on the ability to meet schedule commitments. In the past year, the commercial satellite host and the launch site owner have made small changes to the launch schedule; however, those changes have not affected SKA delivery commitments to the satellite integrator - the SKA project remains on schedule.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Spacebased Kill Assessment	19.989	0.000	0.000
Articles:	-	-	-
Description: The SKA project is an experimental system designed to demonstrate kill assessment for Homeland Defense. It includes SKA sensor-host satellite integration and testing, launch preparations, on-orbit checkout, experimental operations, and supports engineering trade studies and concept evaluations for current and future space based sensors. Specific accomplishments by year follow.			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603895C is transferred to PE 1206895C.			
FY 2019 Plans: In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603895C is transferred to PE 1206895C.			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	19.989	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	37.809	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>

D. Acquisition Strategy

SKA leverages experience that the Johns Hopkins University Applied Physics Laboratory (JHU/APL) has with its extensive history of performing kill assessment activities and conducting experiments associated with the Aegis BMD program. JHU/APL is the developer of the SKA experiment and its primary subcontractor will be responsible for payload integration and hosting accommodation using a firm fixed price contract to contain costs. The SKA experiment uses a commercial satellite program as the platform host for a DOD payload, taking full advantage of a multi-billion dollar space and ground system that already exists. Since MDA and JHU/APL cannot impact the launch schedule of the commercial satellite host, fiscal stability and commitment is required which is a small tradeoff for the significant cost savings that commercial hosting provides.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Spacebased Kill Assessment - Spacebased Kill Assessment - MDSC Support (JRDC Services Contract)	SS/CPAF	NGIS : Schriever AFB, CO	0.142	0.211	Feb 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Spacebased Kill Assessment - SKA Development and Experimentation	C/CPFF	JHU/APL : Laurel, MD	20.948	17.670	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			21.090	17.881		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Spacebased Kill Assessment - Spacebased Kill Assessment - Contract Support Services (CSS)	C/Variou	Various : CO/AL	0.311	0.174	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Spacebased Kill Assessment - FFRDC	C/Variou	Various : CO/AL/MD/VA	1.367	0.647	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Spacebased Kill Assessment - Future Capability	MIPR	Various : Various	0.000	1.003		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Spacebased Kill Assessment - IT User Services	C/CPAF	Northrup Grumman : AL, AK, CA, CO, HI, NM, VA	0.038	0.042	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Spacebased Kill Assessment - Spacebased Kill Assessment - MDA Civilian	Allot	MDA : VA	0.395	0.210	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Spacebased Kill Assessment - Program Mission Support	C/Various	Various : CO/AL/MD/VA	0.918	0.032	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			3.029	2.108		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	24.119	19.989	0.000	0.000	-	0.000	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>
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	Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆													
	Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇													
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023			
SKA Mission Simulation 4	△																					
SKA Integration and Test with Satellite - 1Q2017-4Q2017	◇	◇	◇	◇																		
SKA On-Orbit Check-Out - 4Q2017				◇																		
SKA Launch #1				△																		

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
SKA Mission Simulation 4	1	2017	1	2017
SKA Integration and Test with Satellite - 1Q2017-4Q2017	1	2017	4	2017
SKA On-Orbit Check-Out - 4Q2017	4	2017	4	2017
SKA Launch #1	4	2017	4	2017

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	1.965	0.921	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
 FY 2017, Program Wide Support PWS reflects a proportional change as a result of decreases to the Ballistic Missile Defense System Space Programs. Beginning in FY 2018, PWS was proportionately reallocated as a result of the Ballistic Missile Defense System Space Programs 0603295C transfer to Ballistic Missile Defense System Space Programs 1206895C program element.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	0.921	0.000	0.000
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	0.921	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Facilities and Maintenance SRM (MIPR)	MIPR	Various : Multi: AL, CO, CA, VA, AK	0.343	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	0.522	0.019	Jul 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	1.100	0.902	Aug 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			1.965	0.921		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.965	0.921	0.000	0.000	-	0.000	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆			
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇			
					FY 2017	FY 2018	FY 2019
					FY 2020	FY 2021	FY 2022
					FY 2023		
MD40 Program-Wide Support					◇◇◇◇		

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2017

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	2,212.623	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
MD01: <i>Command & Control, Battle Management, Communications (C2BMC)</i>	1,537.745	278.263	270.033	279.389	-	279.389	291.528	280.506	279.616	289.122	Continuing	Continuing
MC01: <i>Cyber Operations</i>	5.730	1.587	5.305	7.651	-	7.651	26.943	16.180	15.923	23.989	Continuing	Continuing
MT01: <i>C2BMC Test</i>	183.985	56.125	57.302	54.100	-	54.100	54.712	55.539	50.661	52.342	Continuing	Continuing
MX01: <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>	397.104	111.323	103.440	112.910	-	112.910	119.861	120.577	123.051	126.959	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	88.059	18.135	18.782	21.118	-	21.118	22.195	22.071	22.868	23.117	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$16.300 million was required to address emergency warfighting readiness requirements in support of Mobile Sensor Integration Program and Advanced Discrimination. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$24.747 million is required to address emergency warfighting requirements in support of Mobile Sensor Integration Program, Advanced Discrimination, USPACOM Joint Emergent Operational Need Statement (JEON), and Aegis SM-3 Block IIA Missile Test. Additional details are available at a higher classification level.

A. Mission Description and Budget Item Justification

The Command and Control, Battle Management, and Communications (C2BMC) program is the integrating element of the Ballistic Missile Defense System (BMDS). It is a vital operational system that enables the U.S. President, Secretary of Defense and Combatant Commanders at strategic, regional and operational levels to systematically plan ballistic missile defense operations, to collectively see the battle develop, and to dynamically manage designated networked sensors and weapons systems to achieve global and regional mission objectives. Systems linked through C2BMC include Patriot, Terminal High Altitude Area Defense (THAAD), Aegis Ballistic Missile Defense (BMD), Aegis Ashore, Ground-based Midcourse Defense (GMD), and Army Integrated Air and Missile Defense Battle Command System (IBCS), and sensors such as the Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) Radar, Sea-Based X-Band Radar (SBX), Homeland Defense Radar - Pacific (HDR-P), Homeland Defense Radar - Hawaii, Space-Based Infrared System (SBIRS), and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA). The C2BMC program also works to increase coalition partners' capabilities and investigates concepts and explores system engineering issues associated with innovative space applications for a missile defense intercept and defeat system.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)	PE 0603896C / Ballistic Missile Defense Command and Control, Battle Management & Communication

FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+16.650M was required to address Joint Emergent Operational Need requirements to ensure readiness of the BMDS. \$+16.650M Project MD01-C2BMC/C2BMC Development and Deployment to begin OSD Joint Rapid Acquisition Cell (JRAC)-directed efforts to develop and field a limited capability to provide missile warning and tracking of hypersonic weapons.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$16.300 million was required to address emergency warfighting readiness requirements in support of Mobile Sensor Integration Program and Advanced Discrimination.

+ \$16.300M Project MD01-C2BMC/C2BMC Development and Deployment. This is a base budget requirement.

* +\$10.000M was required for studies and analysis to improve communications network for Mobile Sensor Integration Program.

* +\$6.300M was required to improve the BMDS ability to identify lethal and non-lethal objects. This Advanced Discrimination is required to continue to defend the homeland, deployed forces and regional allies against evolving threats of increasing sophistication.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$24.747 million is required to address emergency warfighting requirements.

+ \$19.000M Project MD01-C2BMC/C2BMC Development and Deployment: This is a base budget requirement.

* +\$10.000M is required to complete studies and analysis, and field communications improvements for Mobile Sensor Integration Program.

* +\$6.000M is required to improve the BMDS ability to identify lethal and non-lethal objects. This Advanced Discrimination is required to continue to defend the homeland, deployed forces and regional allies against evolving threats of increasing sophistication.

* +\$3.000M is required to fund the C2BMC portion of the USPACOM Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement - MSE) ballistic missile defense system that expands engagement options and increases coverage area.

+ \$5.747M Project MT01 C2BMC Test: required to fund an SM-3 IIA flight test, in FY19, to demonstrate a capability against threat target in support of homeland defense. This is a base budget requirement.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	456.267	430.115	461.275	-	461.275
Current President's Budget	465.433	454.862	475.168	-	475.168
Total Adjustments	9.166	24.747	13.893	-	13.893
• Congressional General Reductions	-10.239	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	3.900	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	5.036	0.000			
• SBIR/STTR Transfer	-5.831	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	16.300	24.747	0.000	-	0.000
• Other Adjustment	0.000	0.000	13.893	-	13.893

Change Summary Explanation

The FY 2017 Reprogramming Increase reflects C2BMC Experimentation Lab (X-Lab) / Enterprise Sensors Lab (ESL) support of risk mitigation by providing infrastructure upgrades enabling increased data throughput and improved security posture for discrimination integration and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) capabilities.

Increase in FY 2019 from PB 2018 to PB 2019 provides development and deployment of Initial Robust BMDS Post Intercept Assessment capabilities for Increment 7, increased Discrimination development efforts supporting Homeland Defense (Increment 6), upgrades development Lab hardware-in-the-loop (HWIL) infrastructure at the Missile Defense Integration and Operation Center, and increased C2BMC Cybersecurity measures including the implementation of Windows Server 2016 software.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018			
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>					Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
MD01: <i>Command & Control, Battle Management, Communications (C2BMC)</i>	1,537.745	278.263	270.033	279.389	-	279.389	291.528	280.506	279.616	289.122	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

Note

N/A

A. Mission Description and Budget Item Justification

This project funds the development, deployment and operational support of C2BMC capabilities required for BMDS planning, situational awareness, sensor management, and engagement coordination. C2BMC capabilities are traceable to baselined BMDS specifications and Element specifications to ensure the BMDS functions as an integrated system. C2BMC development activities culminate in three key events: simulation-based verification focused on integration testing with other BMDS elements; Site Activation Testing; and BMDS Ground Testing verifying delivery of operational software packages for designated spiral deliveries to the warfighter.

Designated Capability Deliveries include:

The Robust Medium-Range Ballistic Missile (MRBM) Defense / Improved Discrimination European Phased Adaptive Approach (EPAA) Phase 1 and 2 (Spiral 6.4) is partially decommissioned but remains operational in CENTCOM and EUCOM.

Enhanced Homeland Defense (Spiral 8.2-1) is currently fielded and actively sustained. This spiral provides critical Homeland Defense capabilities for increased GMD battlespace, improved threat tracking using multiple sensors communicating via Link 16, enhanced sensor tasking to meet track quality and discrimination timeliness requirements, space situational awareness tasking support, and improved cyber capabilities. Spiral 8.2-1 also integrates the BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) with the BMDS to enhance system level missile-tracking capabilities through earlier cueing of radars and weapon systems.

Fulfilling Presidential mandate, EPAA Phase 3/Engage-on-Remote (EOR) (Spiral 8.2-3) will deliver critical sensor management capability, greater engagement flexibility, improved OPIR-based cueing, and enhanced Aegis BMD defended area by enabling Aegis to use Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) data for EOR engagements.

C2BMC is in the preliminary design phase for Long Range Discrimination Radar (LRDR) Control for Homeland Defense (Spiral 8.2-5). This spiral will increase homeland and regional defense capabilities by providing LRDR sensor management, a BMD System track inclusive of LRDR sensor data, BOA 7.0 leveraging advance threat limited contingency capabilities, Link-16 reporting integration, system level discrimination data integration, transmission of LRDR-based information to GMD Fire Control (GFC) and other BMDS elements, and integration of the BMDS with the new Army Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS).

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>
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Regional and Homeland Defense Enhancements (Increment 7) continues in planning and initiates development efforts during FY 2019. Capabilities associated with this Spiral include C2BMC tasking of OPIR Enterprise assets, enhanced system-level integrated discrimination functionality with Simultaneous Correlation of Unambiguous Tracks (SCOUT), Initial Robust Post Intercept Assessment (PIA), regional weapon system use of Link 16 based system track, AN/TPY-2 tasking improvements to support Aegis Engage on Remote, transmission of advanced discrimination features for regional BMD use, and monitoring of modified Aegis BMD, THAAD, PATRIOT, IBCS peer-to-peer engagement coordination.

Related disciplines provide development and deployment support to C2BMC system capabilities. In support of Hypersonic Defense, C2BMC will provide contingency capability to demonstrate, develop and deploy a detection and warning for advanced threats.

C2BMC International Partner system engineering ensures friends and allies are integrated to the fullest extent possible with U.S. BMDS capabilities. Collaborative system engineering, testing, and fielding facilitate interoperability with North Atlantic Treaty Organization (NATO) and partner nations such as Israel and Japan. C2BMC works with these nations to define and document international interfaces that are compatible with international standards and traceable to U.S. BMDS requirements. C2BMC participates in test events and live fire exercises hosted by international partners to ensure U.S. missile defense weapons, sensors, and C2 systems are interoperable with international systems. C2BMC maintains and upgrades the U.S./NATO secure data sharing gateways located at Ramstein Air Base, Germany, for missile defense operations and training. C2BMC also supports development of Japan's BMD requirements to ensure interoperability of Japanese and U.S. BMD systems (sensors, shooters, command and control) resulting in an integrated regional, operational, and strategic defense of Japan.

C2BMC Modeling and Simulation (M&S) maintains BMDS simulation/stimulation tools and federated models to support development and verification of deployed C2BMC Spirals. The BMDS C2BMC Model (BCM) is used for Flight Test pre-mission analysis and exercises to represent a second Command and Control (C2) Suite for Cross-Area of Responsibility (XAOR) functionality, and supports development and integration of GMD, AN/TPY-2, and Aegis software and models. The BCM program provides a cost effective means to assess and explore the performance space of the BMDS beyond what can be physically tested via Flight Tests and Target of Opportunity collections.

The C2BMC Program Element also sustains an evolutionary development capability to experiment with and prototype candidate C2BMC technologies. C2BMC incorporates BOA enhancements to enable the BMDS to keep pace with emerging threats. C2BMC develops, integrates, and tests advanced algorithms to improve discrimination capabilities and enhance the use of space-based sensor data. BOA fuses worldwide coverage of multiple SBIRS and Intelligence Community sensor data into precision three-dimensional missile tracks that C2BMC uses for radar and fire control cueing. BMDS Overhead Persistent Infra-Red Architecture (BOA) software version 5.1 will provide initial boost phase tracking when delivered to the warfighter with Enhanced Homeland Defense (Spiral 8.2-1) in FY 2018. BOA software version 6.1 will extend discrimination target tracking by adding wideband sensors when delivered with EPAA Phase 3/EOR (Spiral 8.2-3) in FY 2019.

Post Intercept Assessment (PIA) is a BMDS capability that improves engagement effectiveness by synthesizing BMDS sensor multi-phenomenology tracking and discrimination data, communicating specific cueing and tasking messages, and implementing data analysis and decision logic tasks. Through a time-phased approach, each BMDS Element incrementally develops their contributions to the PIA solution. C2BMC's primary contributions to PIA include sensor and weapon

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>
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system interfaces, sensor cueing/tasking, improved track processing, development and integration of multi-phenomenology physics-based prediction models, and the assessment decision logic and integrated display for the BMDS.

In support of MDA's discrimination improvements effort, C2BMC will demonstrate, develop, and deploy multiple techniques to improve BMD System ability to identify lethal and non-lethal objects.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>Title: C2BMC Development and Deployment</p> <p align="right">Articles:</p> <p>Description: Provides funding for development and deployment of C2BMC capability Spirals that will link sensors and shooters to enable integrated BMDS capabilities, integrate BOA with the BMDS architecture to enhance missile tracking capabilities and enable much earlier cueing of radars and shooters, and fulfill Cybersecurity requirements. The Enterprise Sensors Laboratory (ESL) and Experimentation Laboratory (X-Lab) produce key prototypes for further maturation in the C2BMC capability Spiral development process and enables integrated experimentation for C2BMC, ESL, OPIR products, and other BMDS elements through robust connectivity to simulation frameworks, weapon systems, sensors, and operational assets. Recurring accomplishments include development and procurement of hardware, software, network capability system engineering tasks, and artifact development for critical design reviews; participation in test readiness reviews, pre-test engineering and analysis of ground and flight test results, wargames, and exercises in accordance with the BMDS Integrated Master Test Plan (IMTP); site planning, scheduling and hardware acquisition to support planned deployment of C2BMC Spirals and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) capabilities; update/maintain C2BMC Model (BCM) BMDS simulation/stimulation (federated model) and verification scenarios for all C2BMC Spirals deployed and under development; prototyping and characterizing BOA, Discrimination, and C2BMC capabilities. Build and sustain operational data sharing gateways and collaborate with international partners to ensure future interoperability. Specific and/or unique accomplishments for each FY are as follows:</p> <p>FY 2018 Plans: The net decrease from FY 2017 to FY 2018 reflects the completed development, testing and fielding of Enhanced Homeland Defense (Spiral 8.2-1) offset in part by an increase for Discrimination Improvements and Countermeasures Mitigation, LRDR Command & Control risk reduction efforts for NORTHCOM C2BMC mission suite, and BMDS Post Intercept Assessment development. Additionally, decrease captures the FY 2017 Congressional General Reduction for unauthorized prior year funding.</p> <p>MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4): -- Maintain capability to develop/deploy emergent operational requirements.</p>	224.549	213.853	253.472
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Enhanced Homeland Defense (Spiral 8.2-1):</p> <ul style="list-style-type: none"> -- Maintain red/blue force updates into the Planner to stay current with the latest threat and BMDS element updates. <p>EPAA Phase 3 / EOR (Spiral 8.2-3):</p> <ul style="list-style-type: none"> -- Complete development; continue fielding of hardware and capability to EUCOM, CENTCOM, NORTHCOM, and PACOM and support operation. -- Integrate EOR capability support to Aegis 5.1. -- Complete BMDS Overhead Persistent Infra-Red Architecture Phase 6.1 software verification testing and Ship Readiness Review (SRR). -- Continue Integration and testing improved OPIR-based cueing of radars and shooters to add the ability to track threats in all phases of flight. <p>LRDR for Homeland Defense (Spiral 8.2-5):</p> <ul style="list-style-type: none"> -- Continue to conduct/complete preliminary Critical Design Review (CDR) for the following capabilities: <ul style="list-style-type: none"> --- LRDR task management --- Regional peer-to-peer engagement coordination. --- Interoperability with Sea-based X-band Radar (SBX) forward based discrimination data. --- 2020 Integrated Air and Missile Defense Battle Command System Engagement Operations Center (EOC) interoperability. --- Continue prototyping OPIR enhancements to address new threats. --- Integrate C2BMC capabilities with Army's IAMD Battle Command System. --- Initiate BCM development and provide OPIR modeling simulation for ground tests. --- Initiate integration of hypersonic capabilities into the C2BMC program of record. <p>C2BMC Increment 7, regional defense focus:</p> <ul style="list-style-type: none"> -- Initiate Post Intercept Assessment (PIA) Phase 1 and 2 development/integration actions that enables shoot-assess-shoot shot doctrine within the BMDS. <p>FY 2019 Plans:</p> <p>Enhanced Homeland Defense (Spiral 8.2-1):</p> <ul style="list-style-type: none"> -- Maintain ability to develop/deploy capability in response to emergent operational requirements. <p>EPAA Phase 3 / EOR (Spiral 8.2-3):</p> <ul style="list-style-type: none"> -- Complete fielding of hardware and capability to EUCOM, CENTCOM, NORTHCOM, and PACOM and support operation. 			

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>-- Complete fielding of BMDS Overhead Persistent Infra-Red Architecture (BOA) 6.1. -- Provide analysis support for Technical Capability Declaration.</p> <p>LRDR for Homeland Defense (Spiral 8.2-5), homeland defense focus: -- Replan Critical Design Review caused by requirements expansion for Discrimination Data Integration and Integrated Threat Characterization. No impact on final Increment 6b delivery is expected. -- Complete development tasks and conduct Critical Design Review -- Complete model and simulation development to support requirement verification, ground test events and provide Wideband OPIR modeling and simulation for ground tests. -- Continue Exceedance Generation Processing (EGP) from SBIRS measurement level wideband data to improve tracking accuracy and custody for challenging threats. -- Continue physics-based algorithm improvements for missile typing which are necessary to address emerging threats.</p> <p>C2BMC Increment 7, regional defense focus: -- Continue planning and development tasks for Initial Robust BMDS Post Intercept Assessment including Spacebased Kill Assessment (SKA).</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY 2018 to FY 2019 reflects an expansion of C2BMC Increment 6b (LRDR for Homeland Defense (Spiral 8.2-5)) capability for System Level Discrimination Data Integration and Integrated Threat Characterization development and fully funds Initial Robust BMDS Post Intercept Assessment development efforts. Additionally, the increase includes consolidating reporting from Enterprise Sensors Lab (ESL) and C2BMC Experiment Lab (X-Lab) to C2BMC Development and Deployment. ESL and X-lab tasks are integral to C2BMC development; a direct coupling of activities yields a more comprehensive and representative summary of C2BMC development and deployment activities.</p>			
<p>Title: C2BMC Communications</p> <p align="right">Articles:</p> <p>Description: The BMD Communications Network (BCN) ties together an expanding set of sensors and weapons systems to enable the National Command Authority and the commanders at the strategic, theater and tactical levels to optimally engage ballistic missile threats including near simultaneous theater, regional and homeland attacks. Recurring accomplishments include the following:</p>	28.102 -	30.872 -	25.917 -

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Provide GMD Communications Network (GCN) Long Haul Communications Transport (LHCT)) services and a robust, end-to-end, high availability, operational communications network (COMNET) infrastructure with diverse paths that quickly and unambiguously share information across the global BMDS. - Participate in and analyze results from events scheduled in the BMDS IMTP - Provide engineering and deployment support of C2BMC Deployable Interface Nodes - Provide BMDS communications via leased DISA circuits, and resolves real-time operational issues through DISA's Network Operations and Security Center - Provide effective network management to coordinate and integrate information across diverse equipment platforms, interface with other DoD communications systems, evolve information standards and capabilities, and adhere to the DoD Risk Management Framework (RMF). - Upgrade BCN capability by supporting all EPAA phases and DoD teleports to enhance satellite communications. <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p>FY 2018 Plans: The FY 2017 to FY 2018 net increase reflects the hardening of communication that will provide anti-jam and anti-scintillation capability and captures the FY 2017 Congressional General Reduction for unjustified growth.</p> <ul style="list-style-type: none"> - Provide Ground-Based Midcourse Defense support to SBX communications upgrade to replace end of life / end of sale SATCOM equipment and services. - Acquire additional network circuits to support planned EPAA Phase 3/EOR (Spiral 8.2-3) capability deployment. - Initiate planning for modem tech refresh and the next generation waveform integration. <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Acquire network circuits to support the Ground-Based Midcourse Defense Communication Network Modernization. - Conduct Protected Anti-Jam/Anti-Scintillation Wideband Net-Centric System (PAAWNS) modem integration and installations. <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease in FY 2019 from FY 2018 reflects reduced integration and installation costs for PAAWNS modems resulting from reduced FY 2018 hardware purchase.</p>			
<p>Title: Enterprise Sensors Lab (ESL)</p> <p align="right">Articles:</p> <p>Description: ESL performs early integration of new capabilities for future C2BMC BOA development and soaks these capabilities against real-world Targets of Opportunity (TOOs) and MDA flight and ground tests to increase the technical maturity of critical algorithms and reduce risk. To improve the real-time utilization of all available OPIR and other Intelligence Community (IC) data,</p>	20.306 -	15.645 -	0.000 -

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>ESL and supporting activities prototype and demonstrate algorithms that fuse space, airborne, and terrestrial-based sensor data into three-dimensional (3-D) tracks in the boost and early mid-course phases of threat missile flyout, enabling sensor cueing and Launch/Engage-on-Remote (LOR/EOR) intercepts. Additionally, in support of Homeland Defense, ESL extracts features in support of PIA with a goal of enabling a shoot-look-shoot capability and discrimination assessment feedback. Recurring accomplishments include providing prototype development and predicted performance characterization for emerging MDA capabilities.</p> <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p>FY 2018 Plans: Decrease from FY 2017 to FY 2018 reflects FY 2017 risk mitigation efforts providing lab infrastructure upgrades and improved security posture.</p> <ul style="list-style-type: none"> - Expand connectivity to Intelligence Community (IC) and similar architectures and mature IC sensor data processing yielding mutually beneficial real-time data sharing and more robust fused data products. - Initiate Exceedance Generation Processing (EGP) from SBIRS measurement level wideband data to improve tracking accuracy and custody for challenging threats. - Initiate physics-based algorithm improvements for missile typing which are necessary to address emerging treats. - Initiate prototype development and predicted performance characterization for Discriminating Sensors Technology and Spacebased Kill Assessment (SKA). <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease in FY 2019 from FY 2018 reflects consolidating ESL activities into the C2BMC Development and Deployment accomplishment area yielding a more comprehensive and representative summary of C2BMC development and deployment activities.</p>			
<p>Title: C2BMC Experimentation Lab (X-Lab)</p> <p align="right">Articles:</p> <p>Description: The C2BMC X-Lab explores, prototypes, and demonstrates future C2BMC technologies within C2BMC and as an integrated component with other BMDS elements. X-Lab evaluates proposed interfaces and data distribution architectures with the Joint Overhead persistent Infra-Red (OPIR) Ground (JOG), SBIRS to improve cueing efficiency and increase battlespace for Homeland Defense. The lab hosts fielded, in-development and prototype spiral development capabilities and enables flight and ground test participation for C2BMC, ESL, and OPIR products with robust connectivity to simulation frameworks, weapon systems,</p>	5.306 -	6.663 -	0.000 -

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>sensors, and operational assets. X-Lab performs early risk reduction activities resulting in on time, within budget deliveries to the C2BMC program contributing to a more effective BMDS.</p> <p>Recurring accomplishments include collection and analysis of metrics that demonstrate C2BMC performance utilizing representative Suite hardware and software, assessing prospective technologies' impact on the BMDS and characterizing C2BMC Spiral performance in advance of formal deliveries.</p> <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p>FY 2018 Plans: The increase in funding from FY 2017 to FY 2018 reflects the funding increase for BMDS Post Intercept Assessment development.</p> <ul style="list-style-type: none"> - Initiate Post Intercept Assessment prototyping activities. -- Assess Link 16 engagement coordination capabilities for planning and managing the execution of Link 16 remote engagements. This effort will include EOR evaluation in a series of flight and ground tests. -- Evaluate interface requirements and message sets for prototype non-OPIR advanced sensors. <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease in FY 2019 from FY 2018 reflects consolidating X-Lab activities into the C2BMC Development and Deployment accomplishment area yielding a more comprehensive and representative summary of C2BMC development and deployment activities.</p>			
<p>Title: United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEON)</p> <p align="right">Articles:</p> <p>Description: Provides funding for development and deployment of C2BMC portion of the USPACOM Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement - MSE) ballistic missile defense system that expands engagement options and increases coverage area. Specific and/or unique accomplishments for each FY are as follows:</p> <p>FY 2018 Plans: Increase in funding for FY 2018 is attributed to the FY 2018 Missile Defeat and Defense Enhancements (MDDE) Budget Amendment to address emergency warfighting requirements.</p>	0.000 -	3.000 -	0.000 -

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- Configure and deployed C2BMC communication node supporting USPACOM Joint Emergent Operational Need.			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease in FY 2019 reflects the completion of C2BMC efforts supporting the USPACOM communication node.			
Accomplishments/Planned Programs Subtotals	278.263	270.033	279.389

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603881C: <i>Ballistic Missile</i>	197.171	292.262	214.173	-	214.173	199.399	197.451	174.161	152.174	Continuing	Continuing
<i>Defense Terminal Defense Segment</i>											
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	37.809	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	20.910	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing

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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing
• 0604181C: <i>Hypersonic Defense</i>	0.000	75.300	120.444	-	120.444	157.672	142.296	117.381	119.434	0.000	732.527
• 0604673C: <i>Pacific Discriminating Radar</i>	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	186.172	357.659	164.562	-	164.562	91.603	78.112	108.167	133.728	Continuing	Continuing

Remarks

D. Acquisition Strategy

The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Enhanced Homeland Defense (Spiral 8.2-1) will be fielded in FY 2018, fielding of EPAA Phase 3/EOR (Spiral 8.2-3) in FY 2019, and completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber ops support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C2BMC Development and Deployment - Aggregated Discrim	Various	Various : Various	0.000	10.490	Oct 2016	7.765	Oct 2017	5.700	Oct 2018	-		5.700	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA Development	SS/CPAF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	12.794	10.315	Oct 2016	9.541	Oct 2017	4.361	Oct 2018	-		4.361	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Hardware/Software Development, Integration & Test (I&T)	SS/CPHF	Lockheed Martin Team : Huntsville, AL/Colorado Springs, CO	548.520	123.778	Dec 2016	121.451	Dec 2017	108.796	Dec 2018	-		108.796	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Integration	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	160.198	0.000		0.000		8.417	Oct 2018	-		8.417	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Mid-Term Discrim-SCOUT	SS/CPFF	Northrop Grumman Space and Mission Systems : Huntsville, AL	29.128	4.900	Oct 2016	7.133	Aug 2018	6.700	Aug 2019	-		6.700	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Mid-Term Discrim-SCOUT OGA	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	2.400	0.000		1.170	Dec 2017	0.700	Dec 2018	-		0.700	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Contract Support Services	SS/FFP	Cobham Analytic Solutions, ECS, CACI, CSC : Arlington, VA/ Huntsville, AL	227.867	25.026	Oct 2016	0.000		0.000		-		0.000	252.893	505.786	0.000
C2BMC Development and Deployment - Contract Support Services (CSS)	C/CPFF	MiDAESS / TEAMS : Huntsville, AL;	0.000	0.000		22.966	Feb 2018	31.066	Feb 2019	-		31.066	Continuing	Continuing	Continuing

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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
		Colorado Springs, CO; NCR													
C2BMC Development and Deployment - ESL Advance Technology Support	SS/CPAF	Northrop Gruman Space and Mission Systems : Colorado Springs, CO	0.000	0.000		0.000		8.500	Nov 2018	-		8.500	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Federally Funded Research & Development Centers / University Affiliated Research Center	MIPR	MITRE, IDA, ORNL, Aerospace, JHU/APL, GTRI : Arlington, VA/ Huntsville, AL/ Colorado Springs, CO	140.210	21.405	Oct 2016	16.136	Oct 2017	16.460	Oct 2018	-		16.460	Continuing	Continuing	Continuing
C2BMC Development and Deployment - IT User Services	C/CPAF	Northrop Grumman/ Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	4.898	0.000		0.000		5.989	Oct 2018	-		5.989	Continuing	Continuing	Continuing
C2BMC Development and Deployment - MDA Civilian, Travel & PCS	Various	- : Huntsville, AL/ Colorado Springs, CO	128.044	21.635	Oct 2016	22.116	Oct 2017	23.573	Oct 2018	-		23.573	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Models & Simulation	SS/CPIF	Lockheed Martin Team : Huntsville, AL/Colorado Springs, CO	0.000	0.000		0.000		6.685	Nov 2018	-		6.685	Continuing	Continuing	Continuing
C2BMC Development and Deployment - OPIR Integration	SS/CPIF	Lockheed Martin : Huntsville, AL	0.000	1.000	Oct 2016	1.009	Oct 2017	0.000		-		0.000	2.009	4.018	0.000
C2BMC Development and Deployment - Post Intercept Assessment	C/CPAF	SciTec : Newark, NJ	0.000	0.000		3.300	Nov 2017	2.220	Nov 2018	-		2.220	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Post Intercept Assessment Integration	SS/CPIF	Lockheed Martin Team : Huntsville, AL/Colorado Springs, CO	0.000	0.000		0.000		14.181	Nov 2018	-		14.181	Continuing	Continuing	Continuing

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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C2BMC Development and Deployment - Post Intercept Assessment Prototyping	C/CPAF	Corvid : Huntsville, AL	0.000	0.000		0.000		2.220	Nov 2018	-		2.220	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Spiral Development	Various	Sandia, MDA Other : Various	0.000	6.000	Oct 2016	1.266	Oct 2017	2.983	Oct 2018	-		2.983	Continuing	Continuing	Continuing
C2BMC Development and Deployment - X Lab	SS/CPAF	Lockheed Martin : Huntsville, AL	0.000	0.000		0.000		4.921	Oct 2018	-		4.921	Continuing	Continuing	Continuing
C2BMC Communications - Communication Equipment and Fielding	MIPR	DISA, PMDCATS, SPAWAR : Springfield, VA	120.418	12.884	Oct 2016	15.151	Jan 2018	14.222	Jan 2019	-		14.222	Continuing	Continuing	Continuing
C2BMC Communications - BNOSC	SS/CPAF	Lockheed Martin Team / JRDC : Colorado Springs, CO	22.815	4.062	Oct 2016	4.566	Nov 2017	2.426	Nov 2018	-		2.426	Continuing	Continuing	Continuing
C2BMC Communications - C2BMC Integration	Various	Services : DISA Agency	0.000	3.450	Oct 2016	3.665	Oct 2017	0.000		-		0.000	7.115	14.230	0.000
C2BMC Communications - Communication Leases	MIPR	DISA : Arlington, VA	36.479	7.706	Oct 2016	7.490	Oct 2017	9.269	Oct 2018	-		9.269	Continuing	Continuing	Continuing
C2BMC Communications - EUCOM Communications	MIPR	USAFE : Ramstein, DE	13.045	0.000		0.000		0.000		-		0.000	13.045	26.090	0.000
Enterprise Sensors Lab (ESL) - ESL	SS/CPAF	Sandia, Purdue, SciTech, DISA, Army, Navy, AMRDEC : Various	0.000	8.875	Oct 2016	8.161	Feb 2018	0.000		-		0.000	17.036	34.072	0.000
Enterprise Sensors Lab (ESL) - Enterprise Sensor Lab	SS/CPAF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	44.450	11.431	Oct 2016	7.484	Oct 2017	0.000		-		0.000	59.365	122.730	0.000
C2BMC Experimentation Lab (X-Lab) - X-Lab	SS/CPAF	Various / Lockheed Martin : Colorado Springs, CO	46.479	5.306	Oct 2016	6.663	Oct 2017	0.000		-		0.000	57.412	115.860	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
United States Forces Korea (USFK) Joint Emerging Operational Needs Statement (JEON) - C2BMC Hardware/ Software Development, Integration & Test (I&T)	SS/CPIF	Lockheed Martin : Huntsville, Al	0.000	0.000		3.000	Apr 2018	0.000		-		0.000	3.000	6.000	0.000
Subtotal			1,537.745	278.263		270.033		279.389		-		279.389	Continuing	Continuing	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>
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Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,537.745	278.263	270.033	279.389	-	279.389	Continuing	Continuing	N/A

Remarks
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>
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	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
MD01 Command & Control, Battle Management, Communications (C2BMC)	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Spiral 8.2-1 NORTHCOM/PACOM Capability Declaration							△																					
USFK JEON User Node Delivery								△																				
Spiral 8.2-3 EUCOM/CENTCOM Capability Declaration											△																	
Spiral 8.2-3 NORTHCOM/PACOM Capability Declaration												△																
Spiral 8.2-5 Homeland Defense Capability Declaration																				△								

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD01 / <i>Command & Control, Battle Management, Communications (C2BMC)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD01 Command & Control, Battle Management, Communications (C2BMC)	1	2017	4	2023
Spiral 8.2-1 NORTHCOM/PACOM Capability Declaration	2	2018	2	2018
USFK JEON User Node Delivery	4	2018	4	2018
Spiral 8.2-3 EUCOM/CENTCOM Capability Declaration	1	2019	1	2019
Spiral 8.2-3 NORTHCOM/PACOM Capability Declaration	3	2019	3	2019
Spiral 8.2-5 Homeland Defense Capability Declaration	3	2021	3	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC01: <i>Cyber Operations</i>	5.730	1.587	5.305	7.651	-	7.651	26.943	16.180	15.923	23.989	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

C2BMC Cyber Operations sustain the MDA Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plan of Action and Milestones (POA&Ms) for MDA C2BMC mission systems. Activities in this Project are necessary to comply with the Federal Information Systems Modernization Act (FISMA).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Network/System Certification and Accreditation (C&A)	1.587	5.305	7.651
Articles:	-	-	-
<p>Description: This activity maintains the Assessment and Authorization (A&A) and Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and POA&Ms on all MDA information systems. This activity prepares and submits C&A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) / Security Controls Assessor and the AO. Leverages Cross Domain Solution (CDS) as single authority implementing standard security policies for C2BMC across the BMDS. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of the MDA mission, test, and administrative systems.</p> <ul style="list-style-type: none"> - Conduct cybersecurity design, engineering, and architecture planning for C2BMC information technology systems - Plan and test the cybersecurity controls for C2BMC systems - Conduct Security Controls Assessment testing continuous monitoring of C2BMC mission systems and provide POA&Ms to mitigate cybersecurity vulnerabilities. <p>Specific and/or unique accomplishments for each FY are as follows:</p>			
<p>FY 2018 Plans: The increase in funding from FY 2017 to FY 2018 captures transfer of Cross Domain Solution funds from Budget Project MT01-C2BMC Test and reflects the required upgrade of hardware and software to improve C2BMC network defense against cyber threats and enhance cybersecurity posture. The Department plans to implement Windows 10 Secure Host Baseline. Multiple</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Cybersecurity Studies are required that will ensure a more secure C2BMC system is procured and integrated into the BMDS as a part of future acquisition and development efforts. Completion of the studies will then flow to the application of security engineering principles to acquire, design, test, implement and field technical solutions throughout the systems architecture to ensure sufficient protections exist from a threat and risk based approach. Additionally, the increase will fund a NORTHCOM Mission Node to support the increased need for timely cybersecurity testing of vulnerability corrective actions, cybersecurity patching, and hardening on the C2BMC Program.</p> <p>- Initiate hardware/software upgrade to include Net Defense tool sets for real time cyber defense monitoring by the C2BMC Command Center that will support tier 3 defenders.</p> <p>FY 2019 Plans:</p> <p>- Continue purchase of hardware/software upgrades and implementation of Windows Server 2016.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p> <p>The increase in funding from FY 2018 to FY 2019 reflects the continued upgrade of hardware and software and includes migration to Windows Server 2016 to improve C2BMC network defense against cyber threats and enhance cybersecurity posture.</p>			
Accomplishments/Planned Programs Subtotals	1.587	5.305	7.651

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Enhanced Homeland Defense (Spiral 8.2-1) will be fielded in FY 2018, fielding of EPAA Phase 3/EOR (Spiral 8.2-3) in FY 2019, and completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber ops support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>
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Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor`s team to function in an Integrated Product Team environment.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network/System Certification and Accreditation (C&A) - Civ Cyber Labor	Various	MDA Other : Various	0.211	0.348	Oct 2016	0.352	Oct 2017	1.703	Oct 2018	-		1.703	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Core C2BMC	SS/IDIQ	Northrop Grumman : Colorado Springs, CO	0.000	0.682	Nov 2016	0.000		2.677	Oct 2018	-		2.677	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - IA/ CND Network/System C&A	C/CPFF	Torch Technologies : Colorado Springs, CO / Huntsville, AL	5.519	0.557	Jul 2017	0.562	Jul 2018	0.567	Oct 2018	-		0.567	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Information Assurance	SS/CPAF	Lockheed Martin : Colorado Springs, CO / Huntsville, AL	0.000	0.000		4.391	Jan 2018	2.704	Jan 2019	-		2.704	Continuing	Continuing	Continuing
Subtotal			5.730	1.587		5.305		7.651		-		7.651	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5.730	1.587	5.305	7.651	-	7.651	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆															
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇															
					<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 12.5%;">FY 2017</th> <th style="width: 12.5%;">FY 2018</th> <th style="width: 12.5%;">FY 2019</th> <th style="width: 12.5%;">FY 2020</th> <th style="width: 12.5%;">FY 2021</th> <th style="width: 12.5%;">FY 2022</th> <th style="width: 12.5%;">FY 2023</th> </tr> <tr> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> </tr> </table>	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇
FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇													
MC01 Cyber Operations																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MC01 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC01 Cyber Operations	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>					Project (Number/Name) MT01 / <i>C2BMC Test</i>		
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT01: <i>C2BMC Test</i>	183.985	56.125	57.302	54.100	-	54.100	54.712	55.539	50.661	52.342	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

TESTING

Command and Control, Battle Management and Communications (C2BMC) Test supports system flight and ground testing, wargames, and exercises as detailed in the MDA Integrated Master Test Plan (IMTP) to ensure C2BMC capabilities delivered are consistent with the Prioritized Capabilities List and are interoperable with other Ballistic Missile Defense System (BMDS) components.

LAB INFRASTRUCTURE

C2BMC gains efficiencies and minimizes laboratory resource requirements (footprint, personnel, and hardware) by utilizing the C2BMC test bed infrastructure as the laboratory environment supporting System Test, Development, and Sustainment. For System Ground and Flight Test, the labs are used for pre-test analysis, test execution and post-test analysis. For Development, the labs are utilized for software verification and validation testing and system integration testing. For Sustainment, the labs are used to assist with root cause determination for issues discovered on the fielded system and validation of any required software patches.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Integrated Master Test Plan	56.125	57.302	54.100
Articles:	-	-	-
<p>Description: This activity funds C2BMC participation in BMDS flight and ground testing, wargames and exercises, and resources in accordance with the BMDS IMTP. Recurring accomplishments include: Test Execution: - Assess BMDS interoperability, integration, and functionality in lab and distributed environments, leveraging a complex set of scenarios to test the limits of the C2BMC system. Participate in and analyze results of ground tests and flight tests in accordance with the BMDS IMTP. Support all phases of the MDA Ground Test Concept of Operations (CONOPS) and the MDA Flight Test CONOPS. Provide Flight Test Predictive Analysis support. Generate, test, and distribute federated model compatible scenarios for Ground Test and Flight Test Experimentation test support. Use BMDS C2BMC Model (BCM) to support exercise integration testing activities including test case and scenario checkout.</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>Enterprise Sensors Laboratory (ESL):</p> <ul style="list-style-type: none"> - Utilizing the ESL, plan, coordinate, and provide test operations to demonstrate prototype algorithms through flight tests, ground tests and real-world targets of opportunity. The development plans for algorithm improvements focus on track and measurement level sensor data fusion and feature extraction to improve 3-d track formation utilizing a variety of space, airborne, and terrestrial-based sensors. Results from the tests and experiments are provided back to the algorithms development activity to enable algorithm refinement. <p>Experimentation Lab (X-Lab):</p> <ul style="list-style-type: none"> - Utilizing the X-Lab, plan, coordinate, and provide test operations to demonstrate maturing C2BMC technologies and software builds within an integrated C2BMC environment through flight tests, ground tests and real-world targets of opportunity before incorporation into formal C2BMC spiral builds. The development plans for C2BMC improvements focus on the BMDS Post Intercept Assessment (PIA) capability, architecture improvements, and C2BMC algorithm improvements to mitigate development risk. Results from the tests and experiments are provided back to the C2BMC and X-Lab development activity. <p>Wargame and Exercises:</p> <ul style="list-style-type: none"> - Participate in wargames and exercises using current and future C2BMC architectures to support all requesting combatant commands, NATO partners, and Host Nations allowing warfighters to validate Ballistic Missile Defense (BMD) Techniques, Tactics, and Procedures (TTP) specific to all designated Areas of Operations (AOs) to include current and future C2BMC architectures. <p>Resources:</p> <ul style="list-style-type: none"> - Continue the development and upgrades in the C2BMC Testbed (CTB) to support flight & ground tests. Continue Cyber Testing in the CTB to support continuous C2BMC spiral development. Continue C2BMC and NATO planning demonstrations and support to NATO live fire events. Provide Situational Awareness (SA) Node sustainment for the BMDS increment development to support ongoing planning and cooperation in the development and enhancement of interoperability between U.S. BMD systems and the NATO BMD systems. Provide infrastructure, network, and troubleshooting support to C2BMC Command Center (CCC), to include the BMDS Network Operations and Security Center (BNOSC), System Test and Operations Center (STOC), C2BMC System Support Center (CSSC), BMDS Communications Network (BCN), and the Distributed Training system (DTS). <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p>FY 2018 Plans:</p> <p>The net increase from FY 2017 to FY 2018 is a combination of the FY 2017 Congressional Add for FTG-11 test acceleration, increases for tests in accordance with IMTP v19.1 schedule (details at a higher classification level) coupled with the transfer out</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>of Cross Domain Solution funds to Budget Project MC01- Cyber Operations. Additionally, FY 2018 Missile Defeat and Defense Enhancements (MDDE) Budget Amendment increase for SM-3 Block IIA test support.</p> <p>Test Execution:</p> <ul style="list-style-type: none"> - Integrate and test the BMDS OPIR Architecture to enable earlier cueing of sensor and shooter, improve threat tracking, and provide source information for discrimination processing. - Participate in GM, Intercept Flight Test to support the remaining Increment 4, BMDS Enhanced Homeland Defense Increment, and the fielding of Enhanced Homeland Defense (Spiral 8.2-1) in NORTHCOM/PACOM by testing the following capabilities: Engagement support tasking; BMD planning, SBIRS Increment 2 interface change and communications enhancements; AN/TPY-2 Forward-Based Mode (FBM) Space Situational Awareness (SSA); Unified Client for net-centric operations; new C2BMC infrastructure and architecture update. - Continue the execution of BMDS Ground Test, participate in OTA, Intercept Flight Test, and Cycle 2/Cycle 5 testing of C2BMC EPAA Phase 3/EOR (Spiral 8.2-3) suite to support Increment 5, European Phased Adapted Approach (EPAA) Phase 3 Situational Awareness (SA) Node sustainment and Robust IRBM Defense, fielding of C2BMC EPAA Phase 3/EOR (Spiral 8.2-3) in NORTHCOM/PACOM and EUCOM/CENTCOM. - Participate in a baseline of 4 flight test events to characterize performance and obtain experimental results that will be used to mature algorithms that fuse space, airborne, and terrestrial-based sensor data into 3D tracks in the boost and early mid-course phases of threat missile flyout. - Support EPAA Phase 3 Technical Capability Declaration. <p>FY 2019 Plans:</p> <p>Test Execution:</p> <ul style="list-style-type: none"> - Integrate and test the BMDS OPIR Architecture to enable wideband processing; integrate PACOM JEON threat capability. Additional OPIR coverage with the new Highly Elliptical Orbits (HEOs) and Geosynchronous Earth Orbits (GEOs) will be able to increase raid size and improve threat typing. - Participate in flight and ground test events to support the Increment 6 (Spiral 8.2-5) and Homeland Defense including LRDR, mid-term discrimination and Redesigned Kill Vehicle (RKV) integration by testing the following capabilities: C2BMC generation of BMD System Track (discrimination results by C2BMC selection); GMD RKV into the BMDS; SBX Forward-Based Discrimination; Aegis BMD boost phase cues of SBX; Long Range Discrimination Radar (LRDR) Integration into BMDS; Active Sensor Bias Monitoring & Reporting; Existing Sensor Data Interfaces & LRDR Data for Risk Reduction; and Cyber Security Enhancements. - Complete LRDR for Homeland Defense (Spiral 8.2-5) upgrades at the Missile Defense Integration and Operation Center (MDIOC), CO. providing support for test and training. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- Complete analysis associated with NATO Ensemble Test 7 and deliver results to NATO participants per NATO Communications and Information Agency agreement.			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> The decrease from FY 2018 to FY 2019 is mainly attributed to the FY 2018 Missile Defeat and Defense Enhancement Budget Amendment increase for SM-3 Block IIA test support.			
Accomplishments/Planned Programs Subtotals	56.125	57.302	54.100

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	37.809	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	20.910	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0604181C: <i>Hypersonic Defense</i>	0.000	75.300	120.444	-	120.444	157.672	142.296	117.381	119.434	0.000	732.527
• 0604673C: <i>Pacific Discriminating Radar</i>	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537

Remarks

D. Acquisition Strategy

The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Enhanced Homeland Defense (Spiral 8.2-1) will be fielded in FY 2018, fielding of EPAA Phase 3/EOR (Spiral 8.2-3) in FY 2019, and completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber ops support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Integrated Master Test Plan - BMDS Level Testing GOV	MIPR	Army/Air Force : Various	0.000	2.517	Oct 2016	2.002	Oct 2017	2.505	Oct 2018	-		2.505	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure	SS/CPAF	Northrop-Grumman Corporation : Colorado Springs, CO	12.703	25.673	Oct 2016	25.004	Oct 2017	27.133	Oct 2018	-		27.133	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure Support	MIPR	Various : VA; OH; AL; NM; CA	8.246	3.534	Oct 2016	2.517	Oct 2017	1.274	Oct 2018	-		1.274	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS Level Testing	SS/IDIQ	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	73.122	23.614	Jul 2017	27.779	Jul 2018	23.188	Jul 2019	-		23.188	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Integrated Master Test Plan - Integrated Master Test Plan BMDS level Testing (Element/System Test Lab Facilities)	SS/CPAF	Northrop-Grumman Corporation : Colorado Springs, CO	89.914	0.787	Oct 2016	0.000		0.000		-		0.000	0.000	90.701	0.000
Subtotal			183.985	56.125		57.302		54.100		-		54.100	Continuing	Continuing	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	183.985	56.125	57.302	54.100	-	54.100	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
IMTP v19.1 flight and ground test event details are at a higher classification.	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Enterprise Sensor Lab Infrastructure Support	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MT01 / <i>C2BMC Test</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023
Enterprise Sensor Lab Infrastructure Support	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018			
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>					Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
MX01: <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>	397.104	111.323	103.440	112.910	-	112.910	119.861	120.577	123.051	126.959	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

Note

N/A

A. Mission Description and Budget Item Justification

C2BMC Development Support provides operations engineering, integrated logistics, warfighter integration, deployment, and disposal of the current operational system and/or systems fielded in STRATCOM, NORTHCOM, PACOM, EUCOM, and CENTCOM and the operation of the C2BMC Control Center. This activity provides continuous support of the development, deployment, sustainment of the C2BMC training systems, and updates training material to stay current with fielded capabilities.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Operations Engineering	86.542	82.779	95.220
Articles:	-	-	-
<p>Description: This activity funds C2BMC support of current operational, test, and training systems. Recurring efforts include:</p> <ul style="list-style-type: none"> - On-site maintenance, help-desk support, and developer reach-back support to ensure operational availability - C2BMC Command Center (CCC) 24 hours a day, 365 days a year operations providing system and network monitoring, system administration, and network defense against cyber-attacks - Integrated logistics support by providing a secure supply chain; reliability, availability, and maintainability (RAM) engineering; obsolescence engineering; and sparing to ensure operational availability - Cybersecurity engineering providing C2BMC Commercial-off-the-shelf (COTS) software/hardware updates and CCC upgrades that address system vulnerabilities, field quarterly updates to reduce system component vulnerability to cyber-attacks - Information System Security Officers (ISSOs) ensuring C2BMC compliance with latest cybersecurity requirements and policies - System modifications driven by Warfighter Improvement Process (WIP), Continuous Improvement Process (CIP), RAM and obsolescence engineering, and external systems such as SBIRS, GMD Fire Control (GFC), Aegis, Terminal High Altitude Area Defense (THAAD), Navy Link Monitoring and Management Tool (LMMT), AN/TPY-2, Standard Army Com (STACOM), DISA fiber networks, and Allied/Coalition interfaces 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- CCMD integration providing C2BMC training, on-site Subject Matter Experts (SMEs), and surge SME support for real-world events, flight tests, ground tests, exercises, cyber assessments, and wargames</p> <p>- Facility modifications required to house current or future C2BMC equipment and transportation for moving C2BMC equipment</p> <p>- Integrated product support for tactical satellite communications (SATCOM) used in flight tests, hardened SATCOM, and associated shelters</p> <p>- Provide transportation for flight test equipment and SME support and analysis for numerous test, exercise, and real world events</p> <p>- Provide recurring proficiency training to CCMDs and keep training material and systems consistent with operational capabilities</p> <p>Specific and/or unique accomplishments for each FY are as follows:</p> <p>FY 2018 Plans: The net decrease in funding from FY 2017 to FY 2018 reflects the transition of the Transportable Radar Communications Complex (TRCC) and Modernization of Enterprise Terminal Transportable (MET-T) in PACOM, where the Army is assuming support responsibilities for program support of these communications capabilities partially offset by an increase attributed for risk mitigation to Operation Engineering requests supporting emerging Warfighter improvements.</p> <ul style="list-style-type: none"> - Maintain high Operational Availability. - Maintain MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in EUCOM/CENTCOM and Enhanced Homeland Defense (Spiral 8.2-1) in NORTHCOM/PACOM. - Provide recurring proficiency training to CCMDs and kept training material and systems consistent with operational capabilities. - Decommission MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in STRATCOM, NORTHCOM, and PACOM. <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Complete decommission of MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in STRATCOM, NORTHCOM, and PACOM. - Maintain MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in EUCOM/CENTCOM and Enhanced Homeland Defense (Spiral 8.2-1) in NORTHCOM/PACOM. - Initiate decommissioning activities for MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in EUCOM/CENTCOM. - Initiate sustainment of EPAA Phase 3/EOR (Spiral 8.2-3) deployed to EUCOM, CENTCOM, NORTHCOM, and PACOM. <p>FY 2018 to FY 2019 Increase/Decrease Statement: Net increase in funding from FY 2018 to FY 2019 reflects sustainment and operational costs supporting the planned deployment of EPAA Phase 3/EOR (Spiral 8.2-3) to EUCOM, CENTCOM, NORTHCOM, and PACOM coupled with planned reduction of sustainment costs due to decommissioning of MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in STRATCOM, NORTHCOM and PACOM and the initial decommissioning activities for MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in EUCOM/ CENTCOM.</p>				
Title: Concurrent Test, Training, and Operations (CTTO)		24.781	20.661	17.690

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Articles:	-	-	-
<p>Description: This element provides the development and sustainment of the C2BMC Training Support System (TSS), MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) / Enhanced Homeland Defense (Spiral 8.2-1) / EPAA Phase 3/EOR (Spiral 8.2-3) Distributed Training System (DTS) (formerly known as the Distributed Multi-Echelon Training System (DMETS) for PACOM, NORTHCOM, EUCOM, and CENTCOM. C2BMC connects all BMDS Elements through virtual and physical networks to facilitate integrated test, training, and operations within two coexistent realms - Operations and Certification. This enables the warfighter to become proficient on current and future software versions at the operational console; increases the developer's capacity to perform a variety of tests and upgrades on the operational BMDS; and decreases recall-to-mission operations times from weeks and days to hours and minutes. Recurring accomplishments include sustaining current training systems for BMDS training events for the Unified Combatant Command developing the next generation training systems, to include the integration of Red Force / Blue Force capability, to keep current with the operational system capabilities. Specific and/or unique accomplishments for each FY are as follows:</p> <p>FY 2018 Plans: The decrease in funding from FY 2017 to FY 2018 reflects the planned decommissioning of the legacy DMETS upon completion of Enhanced Homeland Defense (Spiral 8.2-1) DTS deployment resulting in reduced development/upgrade efforts. - Deploy and sustain C2BMC EPAA Phase 3/EOR (Spiral 8.2-3) TSS and DTS.</p> <p>FY 2019 Plans: - Initiate development on BMDS Increment 6c LRDR for Homeland Defense (Spiral 8.2-5) TSS and DTS.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease in funding from FY 2018 to FY 2019 reflects planned reduction of TSS/DTS training devices due to completed decommissioning of MRBM Defense/EPAA Phase 1 and 2 (Spiral 6.4) in STRATCOM, NORTHCOM and PACOM.</p>			
Accomplishments/Planned Programs Subtotals	111.323	103.440	112.910

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603881C: <i>Ballistic Missile Defense Terminal Defense Segment</i>	197.171	292.262	214.173	-	214.173	199.399	197.451	174.161	152.174	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	37.809	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	20.910	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing
• 0604181C: <i>Hypersonic Defense</i>	0.000	75.300	120.444	-	120.444	157.672	142.296	117.381	119.434	0.000	732.527
• 0604673C: <i>Pacific Discriminating Radar</i>	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537

Remarks

D. Acquisition Strategy

The C2BMC acquisition strategy is consistent with the Agency's capability-based acquisition strategy that emphasizes testing, incremental development, evolutionary acquisition, and knowledge-based funding. Lockheed Martin Mission Systems was the C2BMC prime contractor via an Other Transaction Agreement contract vehicle, which ended 1st quarter FY 2012. A sole source C2BMC follow-on contract to Lockheed Martin for Spiral Development, Operation and Sustainment, and Testing was awarded 1st quarter FY 2012 for an ordering period of five years through 1st quarter FY 2017. Spiral 8.2 will be fielded in three separate increments. Enhanced

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>
<p>Homeland Defense (Spiral 8.2-1) will be fielded in FY 2018, fielding of EPAA Phase 3/EOR (Spiral 8.2-3) in FY 2019, and completion of system deployment with LRDR for Homeland Defense (Spiral 8.2-5) in FY 2021. This incremental fielding required a modification to the base contract increasing the ceiling by \$870 million and adding an additional five-year ordering period to extend the contract through first quarter FY 2022. Major team members to Lockheed are Northrop-Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber ops support of the C2BMC system. They perform development and testing of C2BMC products in Huntsville, AL; and Colorado Springs, CO; and provide worldwide on-site operations and maintenance support. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment.</p>		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Operations Engineering - Indirect Support	MIPR	DISA DECC/DISA TECC : Various	36.173	6.890	Oct 2016	4.177	Oct 2017	5.229	Oct 2018	-		5.229	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Unit Personnel, Control System Improvement Sustaining Support	MIPR	Army, Navy, Air Force : Various	0.000	0.912	Oct 2016	7.081	Oct 2017	5.274	Oct 2018	-		5.274	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering Training Support	SS/CPAF	Northrup Grumman : Boeing Huntsville, AL	0.000	1.747	Nov 2016	1.869	Nov 2017	1.959	Nov 2018	-		1.959	Continuing	Continuing	Continuing
Operations Engineering - Teleport Sustainment	MIPR	Various : Various	7.505	0.000		0.000		0.000		-		0.000	0.000	7.505	7.505
Operations Engineering - Unit Personnel, Control System Improvement Sustaining Support	SS/CPFF	Lockheed Martin Team : Huntsville, AL	272.226	76.993	Dec 2016	69.652	Dec 2017	82.758	Dec 2018	-		82.758	Continuing	Continuing	Continuing
Concurrent Test, Training, and Operations (CTTO) - CTTO/Training Enhancements	MIPR	Aviation and Missile Research Development and Engineering Center : Various	0.000	8.238	Dec 2016	7.081	Dec 2017	4.530	Dec 2018	-		4.530	Continuing	Continuing	Continuing
Concurrent Test, Training, and Operations (CTTO) - Concurrent Test, Training And Operations	SS/CPAF	Northrop Grumman : Boeing	4.610	0.000		0.000		0.000		-		0.000	0.000	4.610	4.610
Concurrent Test, Training, and Operations (CTTO) - Concurrent Test, Training, and Operations	SS/FPAF	COLSA ARC : Huntsville, AL	3.833	0.000		0.000		0.000		-		0.000	0.000	3.833	3.833
Concurrent Test, Training, and Operations (CTTO) - Training Enhancements	SS/CPIF	Lockheed Martin Team : Huntsville, AL, Colorado Springs, CO	72.757	16.543	Dec 2016	13.580	Dec 2017	13.160	Dec 2018	-		13.160	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			397.104	111.323		103.440		112.910		-		112.910	Continuing	Continuing	N/A

Remarks

N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	397.104	111.323	103.440	112.910	-	112.910	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;"></th> <th style="width: 10%;">FY 2017</th> <th style="width: 10%;">FY 2018</th> <th style="width: 10%;">FY 2019</th> <th style="width: 10%;">FY 2020</th> <th style="width: 10%;">FY 2021</th> <th style="width: 10%;">FY 2022</th> <th style="width: 10%;">FY 2023</th> </tr> </thead> <tbody> <tr> <td>MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support</td> <td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td> </tr> </tbody> </table>						FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support	◇	◇	◇	◇	◇	◇	◇
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support	◇	◇	◇	◇	◇	◇	◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MX01 / <i>Command & Control, Battle Management, Communications (C2BMC) Development Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>					Project (Number/Name) MD40 / <i>Program-Wide Support</i>		
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	88.059	18.135	18.782	21.118	-	21.118	22.195	22.071	22.868	23.117	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support reflects proportional changes as a result of budget changes to the Ballistic Missile Defense Command and Control, Battle Management & Communication program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA-wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	18.135	18.782	21.118
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	18.135	18.782	21.118

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy N/A		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	3.579	0.086		0.376	Jul 2018	0.323	Jul 2019	-		0.323	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi: AK/AL/CA/CO/HI/MD/VA/NJ/NY/OCONUS	3.111	0.000		0.000		0.000		-		0.000	0.015	3.126	0.000
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AK, AL, CA, CO, HI, VA	2.947	1.019	Nov 2016	0.000		3.786	Jan 2019	-		3.786	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AK, AL, CA, CO, HI, VA	22.388	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AK, AL, CA, CO, VA	47.045	0.819	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services Civilian Salaries, Travel, Training	Allot	Various : Multi: AL, CA, CO, VA	8.989	15.150	Nov 2016	18.406	Nov 2017	17.009		-		17.009	2.800	62.354	0.000
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various : Multi: AL, CO, VA etc.	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities Maintenance SRM	MIPR	Various : Multi: AK, CA, CO, AL, MD, NJ, VA	0.000	1.061	Jan 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			88.059	18.135		18.782		21.118		-		21.118	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	88.059	18.135	18.782	21.118	-	21.118	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆					
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇					
			FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
MD40 Program-Wide Support			◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	120.395	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing
MD03: <i>Joint Warfighter Support</i>	76.903	15.042	15.394	15.279	-	15.279	17.584	16.021	17.771	16.872	Continuing	Continuing
MT03: <i>Joint Warfighter Support Test</i>	32.199	30.424	31.206	31.142	-	31.142	33.352	32.940	33.616	34.564	Continuing	Continuing
MC03: <i>Cyber Operations</i>	-	0.000	0.152	0.154	-	0.154	0.156	0.159	0.161	0.164	0.000	0.946
MD40: <i>Program-Wide Support</i>	11.293	1.936	2.202	2.192	-	2.192	2.326	2.328	2.528	2.461	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

The Joint Warfighter Support Program (JWSP) is Missile Defense Agency's primary means for providing direct technical support to Combatant Commands (CCMDs), the Military Services and the Joint Staff on Ballistic Missile Defense System (BMDS) development, testing, and operational support, to include real world testing and validation of the warfighter's operational Integrated Broadcast Service (IBS). It enables delivery of BMDS capabilities to Warfighters and ensures their participation in identification and development of new Ballistic Missile Defense (BMD) capabilities via the Warfighter Involvement Process (WIP). The JWSP allows the Warfighter and Missile Defense Agency to work together to identify gaps, seams, and needs in warfighting capability and enhance BMDS attributes by submitting modification and fielding requests. It also provides 24 hours a day, 365 days a year BMD operational support to Warfighters worldwide. The program enables rapid response to Warfighter Requests for Information (RFIs) and Requests for Analyses (RFAs), which are especially critical to mission success in protecting U.S. forces and other defended assets during "Real World" threat events. The program supports improving products delivered to Warfighters through technical reviews and technical analyses supporting strategic and regional BMD planning, development of shot doctrine and BMD defense design. The JWSP also enables the inclusion of both CCMD and MDA BMD objectives in CCMD/Joint Staff-sponsored wargames and exercises, which are used to sharpen and enhance joint BMD warfighting skills.

MD40 Program-Wide Support (PWS) consists of essential non-headquarters management efforts providing integrated and efficient support to MDA functions and activities across the entire BMDS.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	47.776	48.954	49.524	-	49.524
Current President's Budget	47.402	48.954	48.767	-	48.767
Total Adjustments	-0.374	0.000	-0.757	-	-0.757
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.374	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-0.757	-	-0.757

Change Summary Explanation

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD03 / <i>Joint Warfighter Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD03: <i>Joint Warfighter Support</i>	76.903	15.042	15.394	15.279	-	15.279	17.584	16.021	17.771	16.872	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

There are six primary functions in Joint Warfighter Support (MD03):

- (1) Current Operations Support
- (2) Combatant Command Support
- (3) Military Department Engagement
- (4) Operational BMDS Verification and Validation
- (5) Warfighter Training Support
- (6) Joint Staff Engagement

Detailed descriptions and accomplishments are provided in the following section

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Strategic Warfighter Integration	15.042	15.394	15.279
Articles:	-	-	-
Description: (1) Current Operations Support: - Manages and operates MDA Operations Support Center (OSC) 24 hours a day, 365 days a year and two MDA Operations Centers (MOCs) in Virginia and Alabama daily execution of scheduled BMDS activities; prepares and transmits Logistic Reports. - Manages and executes BMDS Asset Management (BAM) scheduling and execution process. - Leads MDA Operations Support Planning Team (OSPT), an MDA-wide task force supporting Warfighters, Services and the Joint			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD03 / <i>Joint Warfighter Support</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Staff to address real-world contingencies and crisis events.</p> <ul style="list-style-type: none"> - Develops BMDS Annual Plan and BMDS Operating Schedule facilitating key stakeholder coordination and maximizing operational availability of the BMDS; Develops and maintains the Integrated Scheduling Tool. - Facilitates major software/hardware additions to the Operational Capacity Baseline for homeland/regional defenses. - Develops and maintains the BORRS application to collect and report BMDS operational availability and readiness data through the network-based tool to distribute data to OSD, CCMDs, Joint Staff, Military Services, and BMDS Operators. - Provides certification training to BMDS watch officers (BWO), BMDS Safety Officers (BSO), and other Operations Support Center staff. <p>(2) Combatant Command Support (USSTRATCOM, USNORTHCOM):</p> <ul style="list-style-type: none"> - Supports the Warfighter Involvement Process (WIP) and other MDA Warfighter engagement efforts by assisting Warfighters in their update to the annual BMDS Prioritized Capabilities List (PCL) and Modification and Fielding Request List (MFRL). - Supports Joint Functional Component Command Integrated Missile Defense (JFCC IMD) integration by participating in the Warfighter Forum (WFF); a multi-lateral information and decision event to address CCMD, Service and DoD BMDS equities - Assists USNORTHCOM in broadening homeland defense planning to address the full range of USNORTHCOM threats by conducting the Homeland Defense Architecture Working Group (HDAWG) and Shot Management Analysis Cell (SMAC). <p>(3) Military Department Engagement:</p> <ul style="list-style-type: none"> - Facilitates and coordinates Service Boards of Directors (BODs) on Lead Service BMDS related equities, POM development and execution; and element fielding, operations and maintenance. - Maintains daily, strategic-level interfaces with Military Services and Joint Staff; plans for the delivery, fielding, and operation of respective Lead Service BMDS capabilities via senior-level working groups, General Officer Air and Missile Defense and Space forums. - Supports and provides the BMDS capability delivery process and transition and transfer to the Military Services through participation in senior-level working groups, Joint staff directorates, and facilitates General Officer forums. <p>(4) Operational BMDS Verification and Validation</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD03 / <i>Joint Warfighter Support</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>- Provides 24 hours a day, 365 days a year, global system verification and validation operational Integrated Broadcast Service, Common Integrated Broadcast, and Shared Early Warning System for BMD early warning data.</p> <p>- Supports Tactical Data Processor software development, MDA flight tests and other software development efforts using live real-world broadcasts of simulated missile threats.</p> <p>- Support Naval Board of Inspection and Survey (INSURV), Shipboard installation, Aegis On-Demand, Aegis program releases, US and Coalition operational readiness and BMD Exercise requirements to validate equipment, materiel, and tactical readiness while simultaneously providing deployment certification and crew operator qualification; verifies operational readiness of both US and Coalition partners to detect a real-world launch of a ballistic threat.</p> <p>(5) Warfighter Training Support:</p> <p>- Provides Missile Defense Space Warning tool (MDST) support to increase operator proficiency, competence, and confidence; providing initial qualification training for BWOs and BMDS Safety Officers.</p> <p>- Provides technical and programmatic updates for BMD Warfighter training; participates in BMD training and Education Working Group to coordinate BMD training issues with USSTRATCOM and Joint Staff</p> <p>- Supports Fleet Synthetic and Aegis Operator Training to ensure operational readiness of Aegis as the first step in the kill chain for BMD.</p> <p>- Provides Early Warning missile injects for all MT03 war games and exercises and tailored support for other Joint Warfighter Support Test events (as listed in IMTP v19.1 which is at a higher classification level).</p> <p>(6) Joint Staff Engagement</p> <p>- Facilitates and coordinates all Joint Staff interactions with the MDA.</p> <p>- Maintains daily, strategic-level interfaces with the Joint Staff.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD03 / <i>Joint Warfighter Support</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- SEE ABOVE.			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	15.042	15.394	15.279

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603895C: <i>Ballistic Missile Defense System Space Programs</i>	20.910	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Joint National Integration Center Research and Development Contract / Integrated Research and Development for Enterprise Solutions Contract is the major performing integrated contract and was recompeted in FY 2017. The acquisition strategy for Strategic Warfighter Integration mission execution is to employ a contract to perform designated integration and sustainment tasks to conduct BMDs Research, Development, Test and Evaluation (RDT&E). Strategic Warfighter Integration is operated by missile defense subject matter experts composed of Government, military, civilian personnel, Contract Support Services, and major defense contractors.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD03 / <i>Joint Warfighter Support</i>

<u>E. Performance Metrics</u> N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD03 / <i>Joint Warfighter Support</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Strategic Warfighter Integration - Strategic Warfighter Integration - HR A&AS	C/CPFF	MiDAESS : Colorado Springs	0.279	0.143	Nov 2016	0.147	Aug 2018	0.125	Dec 2018	-		0.125	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - IC A&AS	C/CPFF	MiDAESS : Huntsville	0.444	0.232	Mar 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Administrative A&AS	C/CPFF	MiDAESS : Colorado Springs	1.146	0.116	May 2017	0.252	May 2018	0.190	Nov 2018	-		0.190	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Civilian Salaries/ Operations Sustainment	Allot	MDA : Colorado Springs/Huntsville, NCR	26.616	4.123	Oct 2016	4.205	Oct 2017	4.158	Oct 2018	-		4.158	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Current Operations	C/CPAF	JRDC : Colorado Springs	14.607	3.162	Oct 2016	3.056	Nov 2017	2.470	Nov 2018	-		2.470	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - IT	C/CPAF	JRDC/IRES : Colorado Springs, Huntsville	2.683	0.582	Nov 2016	0.530	Nov 2017	0.530	Dec 2018	-		0.530	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD03 / <i>Joint Warfighter Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Wireless Services (JRDC/ IRES)															
Strategic Warfighter Integration - Strategic Warfighter Integration - MDST	C/CPAF	JRDC : Colorado Springs	15.525	1.588	Oct 2016	2.180	Nov 2017	3.450	Oct 2018	-		3.450	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Travel and Training	Allot	MDA : Colorado Springs, Huntsville, NCR	0.932	0.200	Oct 2016	0.225	Oct 2017	0.231	Oct 2018	-		0.231	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Warfighter Support A&AS	C/CPFF	MiDAESS : Colorado Springs, Huntsville, NCR	14.671	4.896	Oct 2016	4.799	Jun 2018	4.125	Nov 2018	-		4.125	Continuing	Continuing	Continuing
Subtotal			76.903	15.042		15.394		15.279		-		15.279	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD03 / <i>Joint Warfighter Support</i>
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Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	76.903	15.042	15.394	15.279	-	15.279	Continuing	Continuing	N/A

Remarks
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency						Date: February 2018													
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>						Project (Number/Name) MD03 / <i>Joint Warfighter Support</i>							
Significant Event Complete ▲		Milestone Decision Complete ★		Element Test Complete ◆		System Level Test Complete ●				Complete Activity ◆									
Significant Event Planned △		Milestone Decision Planned ☆		Element Test Planned ◇		System Level Test Planned ○				Planned Activity ◇									
						FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023	
Strategic Integration Wargame Events in support of MT03						◇◇◇◇◇◇		◇◇◇◇◇◇		◇◇◇◇◇◇		◇◇◇◇◇◇		◇◇◇◇◇◇		◇◇◇◇◇◇		◇◇◇◇◇◇	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD03 / <i>Joint Warfighter Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Strategic Integration Wargame Events in support of MT03	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>				Project (Number/Name) MT03 / <i>Joint Warfighter Support Test</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT03: <i>Joint Warfighter Support Test</i>	32.199	30.424	31.206	31.142	-	31.142	33.352	32.940	33.616	34.564	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Joint Warfighter Support Test is comprised of two primary responsibilities: wargames and exercises and warfighter operational support.

Wargames and exercises:

- Support the Warfighter to plan and conduct worldwide wargames and exercises supporting BMDS development and fielding.
- Enable the Warfighter to define, test, deploy, and employ new missile defense capabilities.
- Support JFCC-IMD BMDS table top exercises to facilitate the global missile defense capability and to refine the European capability concept of operations through low-fidelity demonstration Models & Simulation (M&S).
- Examine current and future BMDS operational capabilities for Geographic (i.e., USCENTCOM, USEUCOM, and USPACOM) and Strategic (i.e., USNORTHCOM and USSTRATCOM) Combatant Commands (CCMDs).
- Complete test planning for BMDS events.

Warfighter operational support (program planning and operations):

- Prepare MDA senior leadership for engagements with the Geographic Combatant Commands (GCCs) by providing logistical support and developing briefings for the GCC Assistant Test Directors (ATDs) and MDA Director.
- Interface with the GCCs on BMD operational issues by providing planning and analysis support and capturing/transmitting warfighter responses in the MDA RFI/RFA database.
- Support GCC contingency activation planning for real-world contingencies and theater security cooperation programs by supervising the activation of MDA assets to use in the operational BMDS.
- Aid GCC participation in BMDS capability definition, design, development, integration, and delivery processes through the Warfighter Involvement Process (WIP) to synchronize capability delivery with operational readiness and acceptance.
- Provide resource management and administration of MT03 personnel and funding.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Wargames and Exercises	25.487	24.161	25.893
Articles:	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MT03 / <i>Joint Warfighter Support Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Description: The Missile Defense Agency will continue to focus on providing operational-level interfaces to the Global Combatant Commands (GCCs) and increasing Warfighter participation to develop future missile defense capabilities. The MDA will continue to enhance Warfighter operational support through internal support activities and proactive execution of Combatant Command (CCMD) interface activities.</p> <ul style="list-style-type: none"> - Work with CCMDs on the inclusion of Allies and regional partners into MDA Ground and Flight tests, and wargame & exercise simulations. - Provide warfighter training simulations in direct support of flight and ground tests. - Serve as liaison between internal MDA organizations and the Joint Functional Component Commander for Integrated Missile Defense (JFCC-IMD) across all functional areas to facilitate Geographic Combatant Command (GCC) participation in the BMDS capability definition, design, development, integration and delivery processes. - Support JFCC IMD and EUCOM in the European Phased Adaptive Approach (EPAA) implementation process through the planning, testing, integration and execution of BMDS wargames and exercises. - Support Joint Staff integration of MDA models into Tier I events through the JOINT, LIVE VIRTUAL CONSTRUCTIVE (JLVC) campaign. - Work with Program Offices and the Warfighter; publish a Concept of Operations that will support future MDA Models and Simulation (M&S) support to BMD wargames and exercises. - Coordinate and integrate CCMD requirements into the BMDS Integrated Master Test Plan. - Support the GCC Assistants to the Director (ATDs) and Liaison Officers (LNOs). - Provide support to the development and update of Ballistic Missile Defense (BMD) portions of CCMD Operation Plans (OPLANS) and Contingency Plans (CONPLANS). - Engage in MDA/GCC interface and synchronization of information regarding capabilities and security cooperation strategies. - Develop and provide Wargames, Exercises and Table Top Exercises (TTX) in support of CCMD-specific scenarios as listed in the R4-4A schedule for the EUCOM, PACOM, CENTCOM and NORTHCOM/STRATCOM Geographic Combatant Commands. <p>Additional GCC interface activities by region will include: USEUCOM Engagement:</p> <ul style="list-style-type: none"> - Coordinate with USEUCOM for continued MDA support of key European Phased Adaptive Approach milestones in order to provide a full range of BMDS capabilities addressing ballistic missile threats to the European theater. - Work with USEUCOM to include NATO Allies and regional partners during MDA Ground tests, Flight tests, Wargames, and Exercises in order to improve Allied - US BMDS interoperability. - Coordinate with MDA program elements to facilitate rapid agency responses to USEUCOM requests for analysis and information. Provide reach-back support for the MDA ATD and LNO in USEUCOM for activities requiring visibility by the MDA Director and Director for Test. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MT03 / <i>Joint Warfighter Support Test</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Coordinate with MDA Global Deployment Program Office to plan and execute actions required for deployment of BMDS assets in the USE</p> <p>USCENTCOM Engagement:</p> <ul style="list-style-type: none"> - Promote CCMD leadership in developing a regional partner data sharing system supporting USCENTCOM regional IAMD architecture development. - Coordinate with MDA program elements, assisting in planning and execution activities supporting USCENTCOM's regional partners. <p>USPACOM Engagement:</p> <ul style="list-style-type: none"> - Assist USPACOM leadership in broadening Phased Adaptive Approach planning to address a full range of threats and integration of allies into the BMDS. - Support USPACOM J3 in efforts to promote purchase of an Aegis Ashore system. - Share operational information and knowledge and help allies develop common operational procedures. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - SEE ABOVE <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - SEE ABOVE <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p> <p>N/A</p>				
Title: Program, Planning and Operations		4.937	7.045	5.249
		Articles:	-	-
<p>Description: MDA will continue to focus on providing operational-level interface to the GCCs and increasing Warfighter participation in the development of future missile defense capabilities. The key Warfighter interface activities include: MDA Operational Support:</p> <ul style="list-style-type: none"> - Support the Operations Support Planning Team (OSPT) activation during heightened period of interest. - Support Warfighters, DoD Agencies, and Military Services in identifying desired missile defense capabilities and characteristics. - Obtain Warfighter participation and advice on desired operational features and approaches to system fielding throughout development. 				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MT03 / <i>Joint Warfighter Support Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Track analysis and responses for CCMD Requests for Analysis (RFA) and Requests for Information (RFI). - Serve as the immediate link between MDA and the GCCs on all Warfighter activities and requirement. - Prepare MDA senior leadership for U.S. Army, Navy, and Air Force BOD meetings and AMD General Officer Steering Committee meetings. - Provide resource management and administration of BMDS Warfighter personnel and budget. - Manage travel, including travel to support the wargames and exercises and the Assistant to the Director (ATDs) and Liaison Officer (LNOs) as MDA representatives at the GCC HQs. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE</p> <p>FY 2019 Plans: - SEE ABOVE</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The FY 2018 to FY 2019 decrease reflects need for additional funding in war games and exercises to support the robust IMTP schedule.</p>			
Accomplishments/Planned Programs Subtotals	30.424	31.206	31.142

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

In order to optimize the performance of the Ballistic Missile Defense System, MDA leverages Defense Department executive agents as well as the MDA Joint National Integration Center Research and Development (JRDC) contract.

The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution to the BMDS. Products and Services will be acquired by competitive means to the extent that is possible and practical.

In 2017, the MDA JRDC contract was recompeted and called the Integrated Research and Development for Enterprise Solutions (IRES).

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MT03 / <i>Joint Warfighter Support Test</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Wargames and Exercises - Combatant Commanders (COCOM) Support	C/CPAF	JRDC/MIPR : Colorado Springs, Huntsville, NCR	18.240	18.443	Nov 2016	16.976	Nov 2017	18.564	Nov 2018	-		18.564	Continuing	Continuing	Continuing
Wargames and Exercises - Wargame Support	C/CPAF	JRDC/MIPR : Colorado Springs	5.818	7.044	Nov 2016	7.185	Nov 2017	7.329	Nov 2018	-		7.329	Continuing	Continuing	Continuing
Program, Planning and Operations - Civilian Salaries/Operations Sustainment	Allot	MDA : Colorado Springs, Huntsville, NCR	2.343	1.972		2.811	Oct 2017	2.202	Oct 2018	-		2.202	Continuing	Continuing	Continuing
Program, Planning and Operations - Combatant Commanders (COCOM) Support A&AS	C/CPFF	MiDAESS : Colorado Springs, Huntsville, NCR	1.049	0.998		1.227	Oct 2017	0.982	Oct 2018	-		0.982	Continuing	Continuing	Continuing
Program, Planning and Operations - Government Travel & Training	Allot	MDA : Colorado Springs, Huntsville, NCR	0.650	0.580		0.792	Oct 2017	0.780	Sep 2019	-		0.780	Continuing	Continuing	Continuing
Program, Planning and Operations - Support to MDA Leadership A&AS	C/CPFF	MiDAESS : Colorado Springs, Huntsville, NCR	4.099	1.387		2.215	Oct 2017	1.285	Oct 2018	-		1.285	Continuing	Continuing	Continuing
Subtotal			32.199	30.424		31.206		31.142		-		31.142	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	32.199	30.424	31.206	31.142	-	31.142	Continuing	Continuing	N/A

Remarks
Prior year funding was captured in MD03 budget project.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MT03 / <i>Joint Warfighter Support Test</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇

	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
IMTP v19.1 war game and exercise event details are at a higher classification.	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MT03 / <i>Joint Warfighter Support Test</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 war game and exercise event details are at a higher classification.	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MC03 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC03: <i>Cyber Operations</i>	-	0.000	0.152	0.154	-	0.154	0.156	0.159	0.161	0.164	0.000	0.946
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project MC03 is the Defensive Cyber Operations Project established in this Program Element (PE) during PBR 2018. Funds were previously reported in Project MD03 of this PE.

A. Mission Description and Budget Item Justification

The funds in this project are required to verify and validate that cybersecurity and/or cybersecurity-enabled products (firewalls, data/network encryption devices, routers, Intrusion Detection Systems, etc.) used within the MDA infrastructure have a current and Evaluated Assurance Level (EAL) certification and rating. They assure that validated IT products are listed on the DOD Approved Products List (APLITS). There is an additional requirement to routinely identify findings and prepare a report with recommendations. The Warfighter Strategic Integration directorate (DDW) requires this support in the IT product evaluation provided. Activities in the Project are necessary to comply with the Federal Information Systems Modernization Act of 2014 (FISMA).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Strategic Warfighter Integration Software Assurance Support	0.000	0.152	0.154
Articles:	-	-	-
Description: Perform manual and automated software code analysis, using GFE tools (e.g. Fortify 360), to detect false positives, weaknesses, and vulnerabilities. 1) Verify and validate cybersecurity and/or cybersecurity-enabled products (firewalls, data/network encryptors, routers, Intrusion Detection Systems, etc.) used within the MDA infrastructure have a current and Evaluated Assurance Level (EAL) certification and rating. Validate IT products are listed on the DoD Approved Products List (APLITS). 2) Participate in meetings with customers to review software analysis findings and proposed courses of action for remediation. 3) Prepare a comprehensive report detailing the weaknesses and vulnerabilities found. Document the references to files and line numbers. 4) Maintain a record of all software code analysis documentation and organized in accordance with Government policy. Specific and/or unique accomplishments to each FY are as follows: FY 2018 Plans: - SEE ABOVE. FY 2019 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MC03 / <i>Cyber Operations</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- SEE ABOVE.			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> N/A			
Accomplishments/Planned Programs Subtotals	0.000	0.152	0.154

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MC03 / <i>Cyber Operations</i>
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Strategic Warfighter Integration Software Assurance Support - DDW Cyber Support (ICVA)	C/CPFF	TEAMS : COS	0.000	0.000		0.152	Mar 2018	0.154	Dec 2018	-		0.154	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.152		0.154		-		0.154	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	0.152	0.154	-	0.154	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MC03 / <i>Cyber Operations</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:12.5%;">FY 2017</th> <th style="width:12.5%;">FY 2018</th> <th style="width:12.5%;">FY 2019</th> <th style="width:12.5%;">FY 2020</th> <th style="width:12.5%;">FY 2021</th> <th style="width:12.5%;">FY 2022</th> <th style="width:12.5%;">FY 2023</th> </tr> </table>			FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023							
FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023														
MC03 Cyber Operations				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td> </tr> <tr> <td style="text-align:center;">◇</td><td style="text-align:center;">◇</td><td style="text-align:center;">◇</td><td style="text-align:center;">◇</td><td style="text-align:center;">◇</td><td style="text-align:center;">◇</td><td style="text-align:center;">◇</td> </tr> </table>										◇	◇	◇	◇	◇	◇	◇
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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MC03 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC03 Cyber Operations	1	2018	1	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	11.293	1.936	2.202	2.192	-	2.192	2.326	2.328	2.528	2.461	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
 Program Wide Support reflects proportional changes as a result of budget changes in the Ballistic Missile Defense Joint Warfighter Support program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	1.936	2.202	2.192
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	1.936	2.202	2.192

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various : Multi: AK, AL, CA, CO, VA	1.200	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various Multi: AL, CO, CA, VA : Various	0.808	0.039	Jul 2017	0.044	Jul 2018	0.033	Jul 2019	-		0.033	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	MDA : Multi:AK,AL, CA, CO, VA	2.606	1.464	Nov 2016	1.300	Nov 2017	1.060	Jan 2019	-		1.060	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	ALATEC , INC. : AL, CO, VA	6.422	0.433	Aug 2017	0.461	Aug 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi:AK, AL, CA, CO, VA	0.000	0.000		0.397	Aug 2018	1.099	Jun 2019	-		1.099	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	MIPR	Naval Surface Warfare Center; VA, AL : Various	0.257	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	Various : Multi: AL, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			11.293	1.936		2.202		2.192		-		2.192	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	11.293	1.936	2.202	2.192	-	2.192	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
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	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603898C / <i>Ballistic Missile Defense Joint Warfighter Support</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	369.479	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
MD22: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	353.956	50.516	50.261	51.841	-	51.841	55.313	54.499	55.597	58.422	Continuing	Continuing
MC22: <i>Cyber Operations</i>	1.568	0.446	0.612	0.610	-	0.610	0.634	0.646	0.659	0.672	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	13.955	2.521	2.392	2.474	-	2.474	2.551	2.619	2.764	2.821	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

FY17 Actuals - realignments occurred between R2a Infrastructure Systems and Support and R2a Infrastructure Systems Repair, Sustainment and Critical Upgrades due to start-up of Integrated Research and Development for Engineering Solutions (IRES) transition contract award.

A. Mission Description and Budget Item Justification

The Missile Defense Integration and Operations Center (MDIOC) is the Missile Defense Agency's (MDA) field operating activity in Colorado Springs, Colorado. It provides necessary infrastructure and support services through a mission execution platform for MDA elements/components and designated Combatant Commanders' Ballistic Missile Defense System (BMDS) operations executing missions at the MDIOC. The Integration Center is the organization responsible for providing a single, integrated set of skilled personnel matrixed from across MDA to manage this mission. The MDIOC mission facilities consist of a highly secure research and development complex and a mission support module (area) located at Schriever Air Force Base, adjacent to North American Aerospace Defense Command (NORAD) and United States Northern Command (USNORTHCOM). The MDA Integration Center provides mission critical system technical capabilities and subject matter expertise in a dedicated and adaptable environment that enables developers, testers, and operators to evolve, assess and deliver the capabilities for layered missile defense execution for homeland defense and theater/regional support. The MDIOC interfaces with the Information Technology/Information Assurance Enterprise to provide high availability access to worldwide secure communications, network health and status monitoring, mission critical restoral capability, and technical expertise for all MDA directed activities and events. The MDIOC functions as the mission control for BMDS distributed ground tests and system wide flight tests enabling the mission and test directors to control both main and associated test operations using secure voice, test, and mission network hubs from the MDIOC. The MDIOC also functions as the only system-level integration and interoperability mission execution platform for BMDS fire control; and it provides the physical interface between the developers and the Combatant Command warfighters.

MDIOC mission facilities contribute to the BMDS by directly supporting the concept of Concurrent Test, Training, and Operations (CTTO) for the BMDS by providing engineering integration, resource scheduling, configuration management, and implementation development support for MDA and BMDS-level test, training, and operational mission execution.

MDIOC Major Program Goals:

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>
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- Provide the capabilities and services necessary to support engineering integration, resource scheduling for ground and flight tests, configuration management, and implementation development support of on-site activities
- Ensure around the clock support and restoral of designated BMDS operational activities
- Improve interface with designated Combatant Command missile defense activities; host/support the headquarters and operations center for the United States Strategic Command
- Joint Functional Component Command - Integrated Missile Defense
- Continue to achieve cost effectiveness and efficiencies by leveraging existing Missile Defense Integration and Operations Center infrastructure, services, processes, and expertise to support assigned missions
- Maintain and improve the reliability, availability, and maintainability of MDIOC mission critical systems

Program-Wide Support (PWS) consists of essential non-headquarters management efforts providing integrated and efficient support to MDA functions and activities across the entire BMDS.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	54.750	53.265	54.505	-	54.505
Current President's Budget	53.483	53.265	54.925	-	54.925
Total Adjustments	-1.267	0.000	0.420	-	0.420
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.267	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.420	-	0.420

Change Summary Explanation

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603904C / Missile Defense Integration and Operations Center (MDIOC)				Project (Number/Name) MD22 / Missile Defense Integration and Operations Center (MDIOC)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD22: Missile Defense Integration and Operations Center (MDIOC)	353.956	50.516	50.261	51.841	-	51.841	55.313	54.499	55.597	58.422	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The Missile Defense Integration and Operations Center (MDIOC) sustains and operates a 24 hours a day, 365 days a year mission complex for critical research, development, testing, training, and operations for BMDS activities. The MDIOC supports the Ground-based Midcourse Missile Defense Mission Control Center Facility, as well as the Command, Control, Battle Management, and Communications (C2BMC) Integration and Test Centers and the C2BMC Experimentation Laboratories. It provides infrastructure support for the Satellite Tracking and Surveillance System's (STSS) Missile Defense Space Center (MDSC); and the Targets and Countermeasures' (TC) Mission Control Center - Targets (MCC-T). The MDIOC also provides developmental support to the Enterprise Sensors Laboratory (ESL) composed of a common satellite ground station and sensor netting test bed for designated Ballistic Missile Defense System (BMDS) elements. The MDIOC supports BMDS test events based on the Integrated Master Test Plan (IMTP). It supports BMDS Critical Engagement Conditions testing and analysis through the operation of the Test Execution Control node for distributed BMDS ground tests. During system flight tests, the MDIOC provides infrastructure (power; Heating, Ventilation and Air Conditioning; and communications) support to the Flight Test Director and crew, and ensures the protection of facility and test assets throughout the test window. Further, the MDIOC provides the facilities that support operations of the Missile Defense Element, manned by the U.S. Army 100th Missile Defense Brigade, the United States Northern Command (USNORTHCOM) C2BMC Command and Control Center (CCC), the United States Strategic Command's (USSTRATCOM's) Joint Functional Component Command-Integrated Missile Defense (JFCC-IMD) and the Missile Defense Agency (MDA) Warfighter Support Center. In addition, the MDIOC supports the MDA Operations Support Center, which provides situational awareness of the health and status of the end-to-end BMDS, and provides network subject matter expertise and technical reach back for the program elements and Combatant Commanders. The MDIOC hosts BMDS wargames and exercises in support of the warfighter, and delivers the requisite infrastructure to integrate the modeling and simulation assets that form system-level constructive simulations for full-envelope BMDS performance assessments, with surrogate capability for BMDS ground tests. The MDIOC maintains a technical repository of BMDS Implementation Architectures for real-time operations and configuration control; provides state change management and asset management technical support for the BMDS; and provides the technical environment for BMDS Watch Officers, Safety Officers, and Information Assurance Officers to perform their assigned duties. The MDIOC also supports the operations of the Joint Early Warning Laboratory (JEWL), which provides USSTRATCOM with quick response analyses of real-world launches, and rapid anomaly identification and resolution.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Infrastructure Systems and Support	18.994	20.656	17.324
Articles:	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Description: RECURRING: MDIOC Communications and Special Purpose Processing Node (SPPN):</p> <ul style="list-style-type: none"> - Establish a DoD compliant SPPN capable of meeting the unique network and data center services required to develop and deploy a layered BMDS to defend the United States. - Provide distinctive specifications and provisioning requirements associated with the MDA Research, Development, Test and Evaluation (RDT&E) Mission. - Provide capabilities that dynamically interconnect and integrate multiple RDT&E systems to large data sets, and enable collaboration in near real-time with National Research Laboratories and Test Ranges; and Defense Industrial Base industry partners throughout the BMDS acquisition lifecycle. - Construct the SPPN infrastructure with routers, switches, firewalls, and intrusion detection systems that provide IT support to over 10,500 MDA classified/unclassified users worldwide. - Provide network operations and network monitoring; development of detailed solutions, designs, and plans; Disaster Recovery and Continuity of Operations rehearsals; internet access management; and web filtering. - Sustain core communications distribution services across the MDA Enterprise. - Plan, engineer, and implement sustainment projects for general IT services and business systems consistent with the IT architecture roadmap. - Acquire and distribute mission critical unclassified and secure communication capability to resident MDA elements/components and BMDS and Warfighter operational elements. - Provide computer hosting of specified threat models and support the integration of other threat tools as required. <p>End User Support:</p> <ul style="list-style-type: none"> - Sustain End User core service support 18 hours a day, 6 days a week for administrative and business information systems for unclassified and classified users - Monitor networks for user compliance with DoD policies and report incidents - Maintain Printing and Copy Services - Sustain email services (Exchange servers, BlackBerry Enterprise Services servers and archiving storage area networks) - Sustain file services (file servers and storage area networks) - Maintain Directory Services (Active Directory and domain controller servers) - Maintain Authentication services (Public Key Infrastructure/Common Access Card) 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Maintain current hardware and software licenses for IT operational systems - Maintain an Integrated Service Desk - Maintain IT life-cycle asset management of end user devices (desktops, laptops, monitors, printers, thin clients, and BlackBerrys) <p>Hardware and Software Asset Management:</p> <ul style="list-style-type: none"> - Manage government property and IT hardware and software in accordance with the Federal Acquisition Regulations (FAR)/DoD FAR Supplements (DFARs) to include accountability, reporting, warehouse management, asset transportation and excess asset management - Maintain an inventory of IT hardware and software assets connected or used in the ULAN, CLAN, SIPRNET and TS/SCI networks <p>Specific and/or unique accomplishments to a FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The decrease from FY 2018 to FY 2019 reflects the realignment of the Cable Plant Cubicle Workstation workload from the Infrastructure Systems and Support R2a to the Facilities and Maintenance R2a. The Infrastructure Implementation Engineering workload integrates into the Engineering and Event support R2a. This realigns the workload to the appropriate function on the new Integrated Research and Development for Enterprise Solutions (IRES) contract and is not content growth or reduction to the overall program content. The decrease also reduces sustainment projects for general IT services and business systems and assume risk in maintaining a consistent IT architecture roadmap.</p>				
Title: Facilities and Maintenance		14.547	14.708	15.685
		Articles: -	-	-
Description: RECURRING: Host Tenant Support(Electrical, Gas, Sewer, Water, Steam, Chilled Water, Waste Water, Landscaping, Refuse Removal, and Communications Support): - Procure utility services through 50th Air Force Space Wing (Host Base) - Sustain utility infrastructure and delivery systems				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>Environmental, Safety and Occupational Health (ESOH):</p> <ul style="list-style-type: none"> - Maintain and updated the program accident prevention plan - Provide required industrial safety training to facility services personnel - Procure and distributed personal protection equipment for contracted activities - Ensure compliance with Hazardous Waste, Hazardous Material Recycling, and National Environmental Policy Act (NEPA) programs - Conduct recurring safety and environmental audits <p>Facilities Operations and Sustainment:</p> <ul style="list-style-type: none"> - Provide 24 hours a day, 365 days a year, facility maintenance break/fix response for all facility systems (electrical; Heating, Ventilation, and Air Conditioning; plumbing; locksmith) with a response time of 15 minutes after normal duty hours - Conduct preventative maintenance inspections (PMIs) for all building systems <p>Facilities Engineering:</p> <ul style="list-style-type: none"> - Conduct Management Process Facility Installation Standard Audits - Provide risk management analysis and mitigation plans - Maintain infrastructure drawings configuration management databases on a limited basis - Develop and document facility long range planning programming - Provide consulting services, preliminary designs and engineering rough order of magnitude estimates for required infrastructure buildout changes <p>Missile Defense Integration and Operations Center (MDIOC) Operating Expenses:</p> <ul style="list-style-type: none"> - Lease General Services Administration (GSA) vehicles and a commercial warehouse - Fund calibration of measuring and monitoring equipment - Fund repair of classified network switches <p>Facility Services:</p> <ul style="list-style-type: none"> - Provide custodial services for over 675,000 square feet of floor space in Buildings 720 and 730 - Provide limited Copy Center and Shuttle Services for over 2,000 personnel - Provide in/out processing - Personnel moves to include cubicle and workstation setup, teardown, and reconfiguration <p>Specific and/or unique accomplishments to a FY are as follows:</p>				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY 2018 to FY 2019 reflects the realignment of the Cable Plant Cubicle Workstation workload as stated in the Infrastructure Systems and Support R2a above. This is not content growth or reduction to the overall program content, only a realignment of the workload to the more appropriate function.</p>			
<p>Title: Engineering and Event Services</p> <p align="right">Articles:</p> <p>Description: RECURRING: - Provide Mission Assurance by ensuring the successful execution of Concurrent Test, Training, and Operations (CTTO) activities at the MDIOC facility. - Ensure independent verification, and coordinate customer validation of all activities, work products and requirements fulfilled by MDIOC Engineering. - Provide Risk Management by identifying, assessing, and prioritizing risks. Coordinate resources to minimize, monitor and control the probability and impact of events. Develop strategies to manage threats, including avoidance, reduction, transfer and retention. - Ensure Coordination and Integration through a proactive approach of sharing critical information necessary for the successful conduct of CTTO activities in a dynamic environment. - Provide Systems Engineering by developing effective solutions through a structured, repeatable process for MDIOC engineering activities. Provide governance and training to stakeholders, enforce policy, establish and maintain a unified board structure for the vetting and implementation of requirements. - Ensure Configuration Management so that CTTO events are not disrupted by multiple competing activities. - Maintain the Technical Baseline to establish a common reference, and implement a formalized process that provides stability across the MDIOC. - Provide Change Management to track changes to the IT and MDIOC physical infrastructure. Understand how any change may affect CTTO activities, and determine when any change is least likely to impact key functionality. Ensure all changes, across the</p>	7.165 -	7.215 -	10.180 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>technical baseline, are clearly recorded and identified on a near-real-time basis.</p> <ul style="list-style-type: none"> - Provide effective requirements management by documenting decisions and information generated during requirements development in conjunction with the design solution processes. - Provide Event Architecture and Engineering Design by coordinating design and implementation of technical architectures for all major MDIOC hosted/supported CTTO activities. Maintain a repository of architectures for real-time configuration management. - Provide cradle to grave event management for MDIOC supported CTTO events. - Provide a Mission Planning Element to oversee the event support life cycle provided by the MDIOC engineering and event support platform. Ensure the fulfillment of technical, personnel, facility, and cybersecurity requirements. - Provide a Mission Execution Element-to ensure asset protection and incident response for all MDIOC supported CTTO events. - Ensure Organizational Integration by establishing and enforcing seamless integration across the MDIOC. Provide a repeatable process for information sharing and coordination. - Provide Cybersecurity to ensure the protection of MDIOC networks, computers, programs and data from attack, damage or unauthorized access. - Provide Contract Program Management oversight including business, finance, contract administration and management. Identify and manage cross-project dependencies. Conduct activities within established cost, schedule, and performance parameters. <p>Specific and/or unique accomplishments to a FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY 2018 to FY 2019 reflects the realignment of workload from the Infrastructure Systems and Support R2a as explained in that R2a Change Summary and reprioritization of funds from Operations and Sustainment R2a as explained in that R2a Change Summary. This rewrite of the Engineering and Event Services R2a succinctly describes the mission requirements</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
without the overly detailed descriptive tasks that previously existed. This rewrite and realignment of workload is not content growth or reduction to the overall program content.				
Title: Operations and Sustainment		4.870	5.682	5.152
		Articles:	-	-
<p>Description: RECURRING:</p> <ul style="list-style-type: none"> - Fund Civilian and CSS positions supporting operations and sustainment of all Missile Defense Integration and Operations Center (MDIOC) activities contributing to the mission execution platform - Provide quality event planning, coordination, logistics, security access and host support for all MDIOC events and visitors - Deliver integrated service coordination for all MDIOC event and protocol support including management of the: <ul style="list-style-type: none"> - Event Registration Web site - Offsite event registration - Security processing, including clearance verification and badging - Arrangement/Coordination/Scheduling of bus transportation - Reservation, setup, and coordination of access for all primary shared MDIOC conference rooms - Operation of Audio Visual equipment during events - Preparation for and conduct of official ceremonies; coordination and hosting of Distinguished Visitor itineraries; and information disclosure approval coordination - Fund Training and Travel <p>Specific and/or unique accomplishments to a FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - SEE ABOVE. <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - SEE ABOVE. <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p> <p>The decrease reflects an internal realignment in FY 2019 of \$0.400 Million resulting from de-scoping workload from the MiDAESS/TEAMS Protocol Support funding within the Operations and Sustainment R2a for increased engineering rigor during the</p>				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
major events supported within the Engineering and Event Support R2a. This rewrite and realignment of workload is not content growth or reduction to the overall program content.			
<p>Title: Infrastructure Systems Repair, Sustainment, and Critical Upgrades</p> <p>Description: RECURRING:</p> <ul style="list-style-type: none"> - Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant) - Fire Suppression System Compliance Project (two quadrants) <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: The decrease from FY 2017 to FY 2018 in the Infrastructure Systems Repair, Sustainment, and Critical Upgrades aligns funding with the MDIOC Facility Sustainment Plan and ensures the Facility maintains a Facility Condition Index that meets Department of Defense established goals. Projects are listed in the R4 schedule</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY 2018 to FY 2019 reflects having to increase electrical distribution and heating, ventilation, and air conditioning capacity to meet increased mission capability requirements and to replace infrastructure (real property) end-of-life components to sustain DoD mandated Facility Condition Index goals.</p>	<p>Articles:</p> <p>4.940</p> <p>-</p>	<p>2.000</p> <p>-</p>	<p>3.500</p> <p>-</p>
Accomplishments/Planned Programs Subtotals	50.516	50.261	51.841

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603294C: <i>Common Kill Vehicle Technology</i>	54.395	252.879	189.753	-	189.753	205.645	254.130	122.494	52.373	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603881C: <i>Ballistic Missile Defense Terminal Defense Segment</i>	197.171	292.262	214.173	-	214.173	199.399	197.451	174.161	152.174	Continuing	Continuing
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603893C: <i>Space Tracking and Surveillance System</i>	37.809	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603898C: <i>Ballistic Missile Defense Joint Warfighter Support</i>	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603913C: <i>Israeli Cooperative Programs</i>	268.735	105.354	300.000	-	300.000	300.000	300.000	300.000	300.000	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Joint National Integration Center Research and Development Contract / Integrated Research and Development for Enterprise Solutions Contract is the major performing integrated contract and is scheduled to be re-competed in FY 2017. The acquisition strategy for MDIOC mission execution is to employ a contract to perform designated integration and sustainment tasks to conduct BMDS Research, Development, Test and Evaluation (RDT&E). The MDIOC is operated by missile defense subject matter experts composed of Government, military, civilian personnel, MDIOC Contract Support Services, and major defense contractors.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Infrastructure Systems and Support - IRES/TBD	C/CPIF	MDIOC/Northrop Grumman Mission Systems : Colorado Springs, CO	0.000	0.000		1.000	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Infrastructure Systems and Support - MDIOC JRDC/ IRES	C/CPAF	MDIOC/Northrop Grumman Mission Systems : Colorado Springs, CO	136.195	18.994	Nov 2016	19.656	Jan 2018	17.324	Oct 2018	-		17.324	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC Custodial	C/FFP	MDIOC/Ability One : Colorado Springs, CO	2.491	1.158	Oct 2016	1.182	Dec 2017	1.205	Dec 2018	-		1.205	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC GSA / Leases / Calibration	MIPR	Various (GSA, Warehouses) : Colorado Springs, CO	6.864	0.617	Nov 2016	0.629	Oct 2017	0.643	Nov 2018	-		0.643	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC IRES/TBD	C/CPIF	MDIOC/Northrop Grumman Mission Systems : Colorado Springs, CO	0.000	0.000		1.000	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC JRDC/IRES	C/CPAF	MDIOC/Northrop Grumman Mission Systems : Colorado Springs, CO	83.447	9.664	Nov 2016	8.699	Nov 2017	10.561	Oct 2018	-		10.561	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC Utilities	MIPR	50th Space Wing : Schriever AFB, CO	17.634	3.108	Oct 2016	3.198	Oct 2017	3.276	Oct 2018	-		3.276	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / Missile Defense Integration and Operations Center (MDIOC)	Project (Number/Name) MD22 / Missile Defense Integration and Operations Center (MDIOC)
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Event Services - MDIOC JRDC/ IRES	C/CPAF	MDIOC /Northrop Grumman Mission Systems : Colorado Springs, CO	59.068	7.165	Oct 2016	7.215	Nov 2017	10.180	Nov 2018	-		10.180	Continuing	Continuing	Continuing
Operations and Sustainment - FFRDC	FFRDC	MDIOC : Colorado Springs, CO	2.167	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Operations and Sustainment - Operations & Sustainment	Allot	MDIOC : Colorado Springs, CO	20.717	2.900	Oct 2016	3.000	Oct 2017	2.836	Oct 2018	-		2.836	Continuing	Continuing	Continuing
Operations and Sustainment - Support Services	C/CPFF	MiDAESS/TEAMS Multi : Colorado Springs, CO	16.596	1.940	Nov 2016	2.622	Nov 2017	2.256	Nov 2018	-		2.256	Continuing	Continuing	Continuing
Operations and Sustainment - Travel and Training	Allot	MDIOC : Colorado Springs, CO	0.663	0.030	Oct 2016	0.060	Nov 2017	0.060	Nov 2018	-		0.060	Continuing	Continuing	Continuing
Infrastructure Systems Repair, Sustainment, and Critical Upgrades - MDIOC JRDC/IRES	C/CPAF	MDIOC/Northrop Grumman Mission Systems : Colorado Springs, CO	8.114	4.940	Dec 2016	2.000	Jan 2018	3.500	Jan 2019	-		3.500	Continuing	Continuing	Continuing
Subtotal			353.956	50.516		50.261		51.841		-		51.841	Continuing	Continuing	N/A

Remarks
Funds for utilities and base communications are specified in the Inter-service Support Agreement with the 50th Space Wing. In addition, the Missile Defense Integration and Operations Center (MDIOC) provides Technical Contract Support Services employees, for MDIOC operations and oversight of the Joint Research and Development Contractor (JRDC), as well as funding for JRDC work as required by the government.

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>
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Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	353.956	50.516	50.261	51.841	-	51.841	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>
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	Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆											
	Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇											
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2017)	◇	◇	◇	◇																								
Replace/repair drainage/sewer system (Phase I -Building 720)	◇	◇	◇	◇																								
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase II)	◇	◇	◇	◇																								
Fire Suppression System Compliance Project (two quadrants)(FY 2017)			◇	◇																								
Replace Heating, Ventilation, and Air Conditioning (HVAC) Chilled Water Pumps (North System)			◇	◇																								
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2018)					◇	◇	◇	◇																				
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase III)					◇	◇	◇	◇																				
Electrical power distribution in two mission quadrants to replace- End-of-Life systems, increase reliability, improve power distribution efficiency, and redundancy to mission critical areas						◇	◇																					
Fire Suppression System Compliance Project (two quadrants)(FY 2018)						◇	◇	◇																				
Replace end-of-life Emergency Lighting Module (Building 730)						◇	◇																					
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2019)									◇	◇	◇	◇																
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase IV)									◇	◇	◇	◇																
Replace/repair drainage/sewer system (Phase III -Building 720)									◇	◇	◇	◇																
Fire Suppression System Compliance Project (two quadrants)(FY 2019)									◇	◇	◇																	
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2020)													◇	◇	◇	◇												
Install Ambient Air Economizer (greening initiative)													◇	◇	◇	◇												
Replace Heating, Ventilation, and Air Conditioning (HVAC) Chilled Water Pumps (North and South Loops)													◇	◇	◇	◇												
Fire Suppression System Compliance Project (two quadrants)(FY 2020)													◇	◇	◇													

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD22 / <i>Missile Defense Integration and Operations Center (MDIOC)</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇

	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023								
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2021)												◇	◇	◇	◇												
Fire Suppression System Compliance Project (two quadrants)(FY 2021)															◇	◇	◇										
Availability/Arc Flash/Short Circuit Coordination Study															◇												
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant) (FY2022)																	◇	◇	◇	◇							
Fire Suppression System Compliance Project (two quadrants) (FY2022)																	◇	◇	◇	◇							
Fire Suppression System Compliance Project (two quadrants) (FY2023)																							◇	◇	◇	◇	
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant) (FY2023)																							◇	◇	◇	◇	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2017)	1	2017	4	2017
Replace/repair drainage/sewer system (Phase I -Building 720)	1	2017	4	2017
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase II)	1	2017	4	2017
Fire Suppression System Compliance Project (two quadrants)(FY 2017)	2	2017	4	2017
Replace Heating, Ventilation, and Air Conditioning (HVAC) Chilled Water Pumps (North System)	2	2017	4	2017
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2018)	1	2018	4	2018
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase III)	1	2018	4	2018
Electrical power distribution in two mission quadrants to replace- End-of-Life systems, increase reliability, improve power distribution efficiency, and redundancy to mission critical areas	2	2018	3	2018
Fire Suppression System Compliance Project (two quadrants)(FY 2018)	2	2018	4	2018
Replace end-of-life Emergency Lighting Module (Building 730)	3	2018	4	2018
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2019)	1	2019	4	2019
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase IV)	1	2019	4	2019
Replace/repair drainage/sewer system (Phase III -Building 720)	1	2019	4	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

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Events	Start		End	
	Quarter	Year	Quarter	Year
Fire Suppression System Compliance Project (two quadrants)(FY 2019)	2	2019	4	2019
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2020)	1	2020	4	2020
Install Ambient Air Economizer (greening initiative)	1	2020	4	2020
Replace Heating, Ventilation, and Air Conditioning (HVAC) Chilled Water Pumps (North and South Loops)	1	2020	4	2020
Fire Suppression System Compliance Project (two quadrants)(FY 2020)	2	2020	4	2020
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant)(FY 2021)	1	2021	4	2021
Fire Suppression System Compliance Project (two quadrants)(FY 2021)	2	2021	4	2021
Availability/Arc Flash/Short Circuit Coordination Study	3	2021	3	2021
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant) (FY2022)	1	2022	4	2022
Fire Suppression System Compliance Project (two quadrants) (FY2022)	1	2022	4	2022
Fire Suppression System Compliance Project (two quadrants) (FY2023)	1	2023	4	2023
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720 (one quadrant) (FY2023)	1	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MC22 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC22: <i>Cyber Operations</i>	1.568	0.446	0.612	0.610	-	0.610	0.634	0.646	0.659	0.672	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The Missile Defense Integration and Operations Center (MDIOC) conducts Cyber Defensive Operations through Key Management Infrastructure and Information Assurance Training which interfaces with the Information Technology/Information Assurance Enterprise to provide secure communications, network health and status monitoring, mission critical restoral capability, and technical expertise.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Cyber Defensive Operations	0.446	0.612	0.610
Articles:	-	-	-
Description: RECURRING: The Missile Defense Integration and Operations Center (MDIOC) conducts Defensive Cyber Operations in the following categories: Key Management Infrastructure - Interface with the Information Technology/Information Assurance Enterprise to provide for the generation, production, control and distribution, and training for utilizing the keying material used with the Agency's cryptographic devices. Information Assurance Training - Maintain an Information Assurance (IA) certified workforce through continuous IA training as required by DoD Directive 8570			
Specific and/or unique accomplishments to a FY are as follows:			
FY 2018 Plans: The increase from FY 2017 to FY 2018 in the Cyber Operations is due to the increase in mandates imposed by Congress to mitigate the cyber security threat to the Agency and DoD.			
FY 2019 Plans: - SEE ABOVE.			
FY 2018 to FY 2019 Increase/Decrease Statement:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MC22 / <i>Cyber Operations</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
The reduction between FY2018 to FY2019 assumes additional risk by reducing the Key Management Infrastructure and Information Assurance Training which interfaces with the Information Technology/Information Assurance Enterprise to provide secure communications, network health and status monitoring, mission critical restoral capability, and technical expertise.			
Accomplishments/Planned Programs Subtotals	0.446	0.612	0.610

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MC22 / <i>Cyber Operations</i>
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Cyber Defensive Operations - Cyber Defensive Operations	C/CPAF	MDIOC/Northrop : Grumman Mission Systems Colorado Springs, CO	1.568	0.446	Dec 2016	0.612	Jan 2018	0.610	Jan 2019	-		0.610	Continuing	Continuing	Continuing
Subtotal			1.568	0.446		0.612		0.610		-		0.610	Continuing	Continuing	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.568	0.446	0.612	0.610	-	0.610	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MC22 / <i>Cyber Operations</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆			
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇			
MC22 Cyber Operations	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MC22 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC22 Cyber Operations	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / Missile Defense Integration and Operations Center (MDIOC)	Project (Number/Name) MD40 / Program-Wide Support
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: Program-Wide Support	13.955	2.521	2.392	2.474	-	2.474	2.551	2.619	2.764	2.821	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support reflects proportional changes as a result of budget changes to the Missile Defense Integration and Operations Center program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	2.521	2.392	2.474
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	2.521	2.392	2.474

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Facilities, Operations, and Maintenance	MIPR	Various : Multi: AK, AL, CA, CO, VA	5.311	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	0.314	0.178	Jul 2017	0.048	Jul 2018	0.037	Jul 2019	-		0.037	0.241	0.818	0.000
Program Wide Support - Agency Operations and Support Services	Reqn	Various : Multi: AK, AL, CA, CO, VA	8.330	2.145	Nov 2016	2.344	Nov 2017	2.437	Aug 2019	-		2.437	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services.	C/CPFF	Various : Alatec INC, AL, CO, VA	0.000	0.198	Aug 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			13.955	2.521		2.392		2.474		-		2.474	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	13.955	2.521	2.392	2.474	-	2.474	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆							
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇							
					FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
MD40 Program-Wide Support					◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603904C / <i>Missile Defense Integration and Operations Center (MDIOC)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603906C / <i>Regarding Trench</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	62.760	7.303	9.113	16.916	-	16.916	18.712	12.012	12.348	12.695	Continuing	Continuing
MD35: <i>Regarding Trench</i>	62.760	7.303	9.113	16.916	-	16.916	18.712	12.012	12.348	12.695	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

B. Program Change Summary (\$ in Millions)

	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>
Previous President's Budget	8.785	9.113	17.100	-	17.100
Current President's Budget	7.303	9.113	16.916	-	16.916
Total Adjustments	-1.482	0.000	-0.184	-	-0.184
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.269	0.000			
• SBIR/STTR Transfer	-0.213	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-0.184	-	-0.184

Change Summary Explanation

Further program details are reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603907C / <i>Sea Based X-Band Radar (SBX)</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	431.892	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
<i>MX46: Sea Based X-Band Radar Development Support</i>	414.948	112.139	141.737	143.604	-	143.604	168.045	151.462	124.637	131.987	Continuing	Continuing
<i>MD40: Program-Wide Support</i>	16.944	3.062	3.958	6.111	-	6.111	6.968	4.256	4.407	4.403	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

FY2018 increase provides increase from 120-days to 330-days at sea for multiple operations, additional sustainment and test support.

FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+4.500M was required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$15.000M was required to address emergency warfighting requirements in support of X86 processor.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$15.000M is required to address emergency warfighting requirements in support of X86 processor.

A. Mission Description and Budget Item Justification

The SBX is an advanced X-band radar that provides the capability for mid-course acquisition, tracking, discrimination and hit-assessment of ballistic missiles. The SBX radar is mounted on a mobile, ocean-going, semi-submersible platform, enabling it to cover any region of the globe. The SBX supports the Ballistic Missile Defense System (BMDS) Homeland Defense mission by tracking and discriminating sophisticated Intercontinental Ballistic Missile (ICBM) threats.

SBX operates at sea for BMDS flight and ground test participation or in an active, operational status when indications and warnings signal the need for enhanced discrimination. The SBX is located in a Pacific port when not required at sea. The SBX maintains vessel certifications for operations at sea as well as software compatibility with the BMDS.

FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: +\$4.500M was required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+ \$3.500M Project MX46-SBX Radar Dev Support/XBR Operations and Support to extend SBX Operations to support NORTHCOM readiness requirements
 + \$1.000M Project MX46-SBX Radar Dev Support/XBR Operations and Support to update X-Band Radar and GMD Fire Control (GFC) interfaces to the x86 architecture to resolve incompatibility and increase radar availability.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603907C / <i>Sea Based X-Band Radar (SBX)</i>
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FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$15.000M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+\$15.000M Project MX46 - Sea Based X-Band Radar Development Support: required to replace the obsolete Superdome processor with a new X86 processor. Upgrades will improve the performance of the SBX in support of testing and real world events. This is a base budget requirement.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$15.000M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+\$15.000M Project MX46 - Sea Based X-Band Radar Development Support: required to replace the obsolete Superdome processor with a new X86 processor. Upgrades will improve the performance of the SBX in support of testing and real world events. This is a base budget requirement.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	93.287	130.695	114.545	-	114.545
Current President's Budget	115.201	145.695	149.715	-	149.715
Total Adjustments	21.914	15.000	35.170	-	35.170
• Congressional General Reductions	-3.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	20.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	9.914	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	-20.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	15.000	15.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	35.170	-	35.170

Change Summary Explanation

The FY 2017 adjustment of \$+9.914 million reflects an increase to address emergency warfighting readiness requirements to ensure readiness of the BMDS. The increase from PB18 to PB19 in FY 2019 supports full operations and x86 XBR superdome replacement to address obsolescence requirements and increase the XBR processing capabilities.

FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+4.500M was required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 4: <i>Advanced Component Development & Prototypes (ACD&P)</i>	PE 0603907C / <i>Sea Based X-Band Radar (SBX)</i>

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$15.000M was required to address emergency warfighting requirements in support of X86 processor.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$15.000M is required to address emergency warfighting requirements in support of X86 processor.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / Sea Based X-Band Radar (SBX)	Project (Number/Name) MX46 / Sea Based X-Band Radar Development Support
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MX46: Sea Based X-Band Radar Development Support	414.948	112.139	141.737	143.604	-	143.604	168.045	151.462	124.637	131.987	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

This project provides developmental operations and support of the SBX Radar and its four major sub-systems: the self-propelled vessel; the X-Band Radar (XBR); the In-Flight Interceptor Communications System Data Terminal; and the communications network. Developmental operations and support activities include operation and sustainment of the vessel, developmental operation and sustainment of the XBR, limited XBR software support and vessel and shore side security.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Vessel Operations and Support	51.472	79.082	72.762
Articles:	-	-	-
Description: Vessel Operations and Support provides for sustainment of the SBX vessel for full operations. This effort maintains annual surveys and U.S. Coast Guard Certifications to ensure readiness for operational contingencies, provides for resupply of SBX, and conducts in port and underway maintenance. The SBX participates in BMDS ground tests and flight tests per the Integrated Master Test Plan (IMTP). This effort also provides force protection for SBX and military flight deck upgrade. Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans: - SEE ABOVE.			
FY 2019 Plans: - SEE ABOVE.			
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects the completion of the military flight deck.			
Title: System Force Protection	4.240	5.869	0.000
Articles:	-	-	-
Description: This effort provides force protection for SBX.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / Sea Based X-Band Radar (SBX)	Project (Number/Name) MX46 / Sea Based X-Band Radar Development Support

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>FY 2018 Plans: -Continue force protection, increasing days at sea from 120 to 330 for full operations</p> <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: This effort moved to Vessel Management in FY 2019.</p>			
<p>Title: XBR Operations and Support</p> <p align="right">Articles:</p>	56.427 -	56.786 -	70.842 -
<p>Description: This effort operates and sustains the XBR at full operations, operates and sustains SBX communications systems, performs mission integration functions, and provides support for contingency operations with manning for improved readiness enabling rapid response time from notification to underway. XBR Operations and Support maintains limited software sustainment for system capability with the BMDS and fields additional XBR capability to the Warfighter with the BMDS capability increment. This effort also provides precision track, discrimination, and hit assessment for engagement support in BMDS ground tests and flight tests per the approved IMTP. Additional development efforts include x86 XBR superdome replacement to address obsolescence requirements and increase the XBR processing capabilities. Specific and/or unique accomplishments to each FY are as follows:</p>			
<p>FY 2018 Plans: -Complete implementation of a DoD Regional Clock for the BMDS to improve warfighter readiness by ensuring integrity and availability of positioning data in order to address emerging DoD Execution Order</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects x86 XBR superdome replacement finalization of the x86 architecture and initial vessel integration.</p>			
Accomplishments/Planned Programs Subtotals	112.139	141.737	143.604

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603179C: Advanced C4ISR	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / Sea Based X-Band Radar (SBX)	Project (Number/Name) MX46 / Sea Based X-Band Radar Development Support
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603891C: <i>Special Programs - MDA</i>	289.364	365.190	422.348	-	422.348	406.779	405.289	425.469	403.884	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603898C: <i>Ballistic Missile Defense Joint Warfighter Support</i>	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0604879C: <i>Ballistic Missile Defense Sensor Test</i>	81.376	101.839	81.001	-	81.001	77.654	68.026	101.091	81.903	Continuing	Continuing

Remarks

D. Acquisition Strategy

SBX is contractor operated and maintained through a variety of contracts between the Navy and MDA. SBX-1 Vessel Management and Security contracts are managed by Military Sealift Command. The SBX radar is operated and maintained on contracts managed by MDA.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / Sea Based X-Band Radar (SBX)	Project (Number/Name) MX46 / Sea Based X-Band Radar Development Support
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Vessel Operations and Support - Force Protection	MIPR	Military Sealift Command : Va	0.000	0.000		0.000		6.014	Feb 2019	-		6.014	Continuing	Continuing	Continuing
Vessel Operations and Support - Fuel	MIPR	Military Sealift Command : VA	38.053	5.638	Nov 2016	9.885	Jan 2018	11.494	Jan 2019	-		11.494	Continuing	Continuing	Continuing
Vessel Operations and Support - Navy Transition Office	MIPR	US Navy : AL	5.732	0.000		0.000		0.000		-		0.000	0.000	5.732	0.000
Vessel Operations and Support - Operational Support Vessel (OSV Resupply)	MIPR	Military Sealift Command : VA	0.000	10.629		14.670	Feb 2018	17.288	Feb 2019	-		17.288	Continuing	Continuing	Continuing
Vessel Operations and Support - Program Management Office	MIPR	Military Sealift Command : VA	3.701	1.130	Nov 2016	1.900	Oct 2017	1.724	Oct 2018	-		1.724	Continuing	Continuing	Continuing
Vessel Operations and Support - SBX Operations & Support (Vessel)	MIPR	Military Sealift Command : VA	122.200	21.333	Oct 2016	33.654	Oct 2017	26.310	Oct 2018	-		26.310	Continuing	Continuing	Continuing
Vessel Operations and Support - SBX Vessel Maintenance	MIPR	Tote : HI/NJ	24.371	3.677	Oct 2016	8.915	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Vessel Operations and Support - Vessel Mission Integration	C/FFP	Gryphon Tech. : AL/ HI	39.225	9.065	Dec 2016	10.058	Dec 2017	9.932	Dec 2018	-		9.932	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / Sea Based X-Band Radar (SBX)	Project (Number/Name) MX46 / Sea Based X-Band Radar Development Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
System Force Protection - Force Protection	SS/CPFF	AQuate : HI	22.267	4.240	Oct 2016	5.869	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
XBR Operations and Support - SBX Communications Support	SS/CPIF	Boeing : AL/HI	7.768	2.372	Dec 2016	2.701	Nov 2017	2.743	Jan 2019	-		2.743	Continuing	Continuing	Continuing
XBR Operations and Support - XBR Operations & Support	SS/CPIF	Raytheon : AL/AK/HI	151.631	54.055	Nov 2016	54.085	Nov 2017	68.099	Dec 2018	-		68.099	Continuing	Continuing	Continuing
Subtotal			414.948	112.139		141.737		143.604		-		143.604	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency								Date: February 2018			
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0603907C / Sea Based X-Band Radar (SBX)				Project (Number/Name) MX46 / Sea Based X-Band Radar Development Support			
	Prior Years	FY 2017		FY 2018		FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	414.948	112.139		141.737		143.604	-	143.604	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / <i>Sea Based X-Band Radar (SBX)</i>	Project (Number/Name) MX46 / <i>Sea Based X-Band Radar Development Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇

	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
IMTP v19.1 flight and ground test event details are at a higher classification.	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / <i>Sea Based X-Band Radar (SBX)</i>	Project (Number/Name) MX46 / <i>Sea Based X-Band Radar Development Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / Sea Based X-Band Radar (SBX)	Project (Number/Name) MD40 / Program-Wide Support
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	16.944	3.062	3.958	6.111	-	6.111	6.968	4.256	4.407	4.403	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
 Program Wide Support reflects proportional changes as a result of budget changes to the Sea-Based X-Band Radar (SBX) program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	3.062	3.958	6.111
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	3.062	3.958	6.111

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / <i>Sea Based X-Band Radar (SBX)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / Sea Based X-Band Radar (SBX)	Project (Number/Name) MD40 / Program-Wide Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Facilities, Operations and Maintenance	MIPR	Various : Multi: AK, AL, CA, CO, VA	1.613	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	1.779	0.062	Jul 2017	0.079	Jul 2018	0.093	Jul 2019	-		0.093	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi: AL, CA, CO, VA	5.808	3.000	Mar 2017	3.879	Mar 2018	6.018	Mar 2019	-		6.018	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (CPAF)	C/CPAF	Northrop Grumman : CO	7.541	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: VA,WA	0.203	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Dept of Labor : VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			16.944	3.062		3.958		6.111		-		6.111	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	16.944	3.062	3.958	6.111	-	6.111	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / <i>Sea Based X-Band Radar (SBX)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆					
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇					
			FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
MD40 Program-Wide Support			◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603907C / <i>Sea Based X-Band Radar (SBX)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,659.554	268.735	105.354	300.000	-	300.000	300.000	300.000	300.000	300.000	Continuing	Continuing
MD20: <i>Israeli Upper Tier</i>	468.805	84.893	56.861	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MD26: <i>Israeli ARROW Program</i>	362.014	67.331	10.841	163.000	-	163.000	159.000	173.000	173.000	173.000	Continuing	Continuing
MD34: <i>Short Range Ballistic Missile Defense (SRBMD)</i>	828.735	116.511	37.652	137.000	-	137.000	141.000	127.000	127.000	127.000	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Content supports expected contributions from Israel per international agreements.

A. Mission Description and Budget Item Justification

Since 1986, the United States and the State of Israel have cooperated on missile defense. Currently, Missile Defense Agency (MDA) has three major projects with Israel to develop and improve their indigenous capability to defend against short and medium range ballistic missiles. These include Upper Tier Interceptors (MD20), the Arrow Weapon System (MD26) and the Short-Range Ballistic Missile Defense, also known as the David's Sling Weapon System (MD34). Within these projects MDA develops and produces weapon systems, conducts tests, and exercises interoperability between U.S. Ballistic Missile Defense System (BMDS) and the Israeli Missile Defense Architecture.

The United States and State of Israel will enter a Memorandum of Understanding (MOU) in which 'Such funding, should over a ten year period beginning in FY 2019 and ending in FY 2028, be provided at a level of \$500 million per year.' These funds will be distributed between the Israeli Programs in RDT&E and Procurement Funds.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	103.835	105.354	108.002	-	108.002
Current President's Budget	268.735	105.354	300.000	-	300.000
Total Adjustments	164.900	0.000	191.998	-	191.998
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	164.900	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	191.998	-	191.998

Change Summary Explanation

- Additional RDT&E funds were requested to be transferred from Procurement Funding to match the Israeli Programs continued development and production profiles for the FYDP. Funding for RDT&E and Procurement still remains within the \$500M defined in the MOU.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD20 / <i>Israeli Upper Tier</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD20: <i>Israeli Upper Tier</i>	468.805	84.893	56.861	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This project code encompasses the Missile Defense Agency's (MDA) U.S.-Israeli cooperative program for the Israeli Upper Tier Program.

A. Mission Description and Budget Item Justification

Israeli Upper Tier Interceptor (UTI) Project: The Upper Tier Program provides the Arrow-3 missile, increasing the system's capability against advanced medium range threats by providing approximately four times the current Arrow-2 battle space. The primary near term objective is to complete and demonstrate Upper Tier design, and continue Initial Lot Production (ILP) deliveries.

This project provides funding for the Upper Tier component of the Arrow Weapon System (AWS) development. The United States through the cooperative effort gains knowledge and experience of the Israeli Defense Forces operation of a multi-layered defense architecture. This project also includes the procurement of the Silver Sparrow Air-Launched Target which is necessary to validate the performance of the Arrow-3 Missile and related Block 5 spiral development activities.

The previous budget for UTI spiral development and UTI upgrades will be allocated as part of the Arrow Weapon System (MD26: Israeli ARROW Program). The UTI initial development and Low Rate Initial Production will be complete. Continued development will be at the AWS level and not interceptor only.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Upper Tier Interceptor	84.893	56.861	0.000
Articles:	-	-	-
<p>Description: The scope of the Upper Tier Program covers interceptor development, testing, material procurement to include initial lot production, and integration of spiral software development for Block 5 AWS.</p> <p>Recurring Accomplishments include:</p> <ul style="list-style-type: none"> - Conduct Testing of the Arrow-3 Interceptor - Conduct algorithm design reviews to verify requirements - Continue Interceptor Spiral Development - Procurement and Delivery of Initial Lot Production assets and Test Articles <p>Specific and/or unique accomplishments to each FY are as follows:</p>			
<p>FY 2018 Plans:</p> <ul style="list-style-type: none"> -Testing of the Arrow-3 Interceptor as scheduled in the R4A. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD20 / <i>Israeli Upper Tier</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
-Test Number #4 design review.			
<i>FY 2019 Plans:</i> N/A			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> -Development funds will be incorporated into Arrow Weapon System Development (MD 26) as part of the MOU. Additional RDT&E funds were requested to be transferred from Procurement Funding to match the Israeli Programs continued development and production profiles for the FYDP. Funding for RDT&E and Procurement still remains within the \$500M defined in the MOU.			
Accomplishments/Planned Programs Subtotals	84.893	56.861	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Upper-Tier Interceptor Project Agreement under the Research, Development, Test and Evaluation (RDT&E) Framework agreement between the U.S. and Israel creates a joint program office to manage this program. Missile Defense Agency (MDA) and the Israeli Ministry of Defense (IMoD) continue to implement best management practices that allow for the more effective use of program management tools to ensure risk is adequately managed to include Knowledge Points that assess Israel's development progress. The DoD U.S. Israeli Cooperative Program Office jointly manages the Upper Tier program with IMoD to ensure that all systems are delivered on time, on budget, and meet the needs of the warfighter. The program is equitably funded between the U.S. and Israel. A portion of the Israeli cost share comes from non-financial contributions such as previously completed work prior to joint program initiation. Contracts are awarded by IMoD or MDA dependent on what is most advantageous to the Joint Governments. In regard to the Upper Tier Interceptor, IMoD will contract with Israel Aerospace Industries (IAI). IAI subcontracts with Israeli companies, Boeing and other U.S. companies.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / Israeli Cooperative Programs	Project (Number/Name) MD20 / Israeli Upper Tier
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Upper Tier Interceptor - Upper Tier Interceptor	C/CPFF	Israel Aerospace Industries (IAI) : Israel	468.805	84.893	Dec 2016	56.861	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			468.805	84.893		56.861		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD20 / <i>Israeli Upper Tier</i>
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Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	468.805	84.893	56.861	0.000	-	0.000	Continuing	Continuing	N/A

Remarks
Contract cost reflect U.S. contribution only. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD20 / <i>Israeli Upper Tier</i>
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	Significant Event Complete ▲			Milestone Decision Complete ★			Element Test Complete ◆			System Level Test Complete ●			Complete Activity ◆								
	Significant Event Planned △			Milestone Decision Planned ☆			Element Test Planned ◇			System Level Test Planned ○			Planned Activity ◇								
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
Israeli Cooperative Arrow 3 Intercept Test #2- FY 2018				◇	◇	◇															
Israeli Cooperative Arrow 3 Intercept Test #3 FY 2018				◇	◇	◇															

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD20 / <i>Israeli Upper Tier</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Israeli Cooperative Arrow 3 Intercept Test #2- FY 2018	1	2018	4	2018
Israeli Cooperative Arrow 3 Intercept Test #3 FY 2018	1	2018	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD26 / <i>Israeli ARROW Program</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD26: <i>Israeli ARROW Program</i>	362.014	67.331	10.841	163.000	-	163.000	159.000	173.000	173.000	173.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This project code encompasses the Missile Defense Agency's (MDA) U.S.-Israeli cooperative program for the Israeli Arrow Weapon System Program.

A. Mission Description and Budget Item Justification

Israeli Arrow Weapon System (AWS): This system includes block upgrades to the AWS components which enhances capabilities against evolving medium range threats by increasing the total defended area. AWS elements include the Arrow-2 missile and launcher, Citron Tree Battle Management Center (BMC), Green Pine (GP) and Super Green Pine (SGP) Radars, and the Hazelnut Tree Launcher Control Center (LCC). Also included is the integration of Block 5 assets which include the Arrow-3 missile and launcher.

Arrow Block 5 development will also incorporate a Long Range Detection Suite that consists of an unmanned aerial vehicle Airborne Early Warning System (ABEWS) and Sharp Eye Radar for increased sensor range, early detection and enhanced raid size capacity. The program also includes the continued development of Arrow's interoperability with U.S. BMDS.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Arrow System Improvement Program	60.969	4.479	156.638
Articles:	-	-	-
Description: The Arrow Weapon System (AWS) continues development of Block 4 and Block 5 spiral development. Included is the integration of Block 5 assets which consists of the Arrow-3 missile, launcher and the Long Range Detection Suite (LRDS). Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans: -SEE ABOVE.			
FY 2019 Plans: -Conduct Block 4 Flight Test proving improved system performance -Continued system spiral development for Block 5 -Continue proven Interoperability with U.S. Assets -Continued enhancements to existing AWS System Components			
FY 2018 to FY 2019 Increase/Decrease Statement:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD26 / <i>Israeli ARROW Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
Development funds will be incorporated from the Upper Tier Interceptor Budget (MD20) as part of the MOU. Additional RDT&E funds were requested to be transferred from Procurement Funding to match the Israeli Programs continued development and production profiles for the FYDP. Funding for RDT&E and Procurement still remains within the \$500M defined in the MOU. Procurement was lowered from \$392M in FY19 to \$200M.				
Title: Israeli Test Bed (ITB)		3.535	3.535	3.535
Articles:		-	-	-
Description: The Israeli Test Bed (ITB) provides experiments to evaluate Human Machine Interface (HMI) battle management and integration of Block 5 Arrow Weapon System Techniques Tactics and Procedures (TTPs) and CONOPs. Specific and/or unique accomplishments to each FY are as follows: FY 2018 Plans: -SEE ABOVE. FY 2019 Plans: -SEE ABOVE. FY 2018 to FY 2019 Increase/Decrease Statement: N/A				
Title: Israeli Systems Architecture and Integration (ISA&I)		2.827	2.827	2.827
Articles:		-	-	-
Description: Israeli Systems Architecture and Integration conducts studies to assess Israel's future 2025 Missile Defense Architecture. This identifies the preferred missile defense architecture and reference threat for 10-15 year future epoch and interoperability special studies on regional threats and growth path options. Specific and/or unique accomplishments to each FY are as follows: FY 2018 Plans: -SEE ABOVE. FY 2019 Plans: -SEE ABOVE. FY 2018 to FY 2019 Increase/Decrease Statement: N/A				
Accomplishments/Planned Programs Subtotals		67.331	10.841	163.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD26 / <i>Israeli ARROW Program</i>

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The DoD U.S. Israeli Cooperative Program Office jointly manages the Arrow Program with Israel Ministry of Defense (IMoD) to ensure that all systems are delivered with quality on time, on budget, and meet the needs of the warfighter. The program funding is equitably funded between the U.S. and Israel with Israel providing matching contributions. However, a portion of the Israeli cost share comes from non-financial contributions such as previously completed work prior to joint program initiation. Contracts are awarded by IMoD or MDA dependent on what is most advantageous to the Joint Governments. In regard to AWS, IMoD contracts on behalf of U.S. government with Israel Aerospace Industries (IAI). IAI subcontracts with Israeli and U.S. companies. For the Israeli Test Bed, the Missile Defense Agency (MDA) contracts directly with Elbit Systems, Ltd. while IMoD provides an equitable share of the funding to the U.S. Finally, MDA provides funding and contracts directly with WALES, Ltd for the Israeli System Architecture and Integration program.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD26 / <i>Israeli ARROW Program</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Arrow System Improvement Program - Arrow System Improvement Program (ASIP)	C/CPFF	Israel Aerospace Industries (IAI) : Israel	313.848	60.969	Dec 2016	4.479	Dec 2017	156.638	Dec 2018	-		156.638	Continuing	Continuing	Continuing
Israeli Test Bed (ITB) - Israeli Test Bed	C/FFP	Elbit Systems : Israel	28.280	3.535	Dec 2016	3.535	Dec 2017	3.535	Nov 2018	-		3.535	Continuing	Continuing	Continuing
Israeli Systems Architecture and Integration (ISA&I) - ISA&I	C/FFP	Wales LTD : Israel	19.886	2.827	Dec 2016	2.827	Dec 2017	2.827	Oct 2018	-		2.827	Continuing	Continuing	Continuing
Subtotal			362.014	67.331		10.841		163.000		-		163.000	Continuing	Continuing	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD26 / <i>Israeli ARROW Program</i>
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Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	362.014	67.331	10.841	163.000	-	163.000	Continuing	Continuing	N/A

Remarks
Contract cost reflect U.S. contribution only.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD26 / <i>Israeli ARROW Program</i>
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	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Israeli Test Bed Experiments FY 2017	◆	◆	◆	◆																								
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2017	◆	◆	◆	◆																								
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2018					◇	◇	◇	◇																				
Israeli Test Bed Experiments FY 2018					◇	◇	◇	◇																				
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2019									◇	◇	◇	◇																
Israeli Test Bed Experiments FY 2019									◇	◇	◇	◇																
Arrow Weapon System Flight Test FY 2019									◇	◇	◇	◇																
Israeli Test Bed Experiments FY 2020													◇	◇	◇	◇												
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2020													◇	◇	◇	◇												
Arrow Weapon System Flight Test FY 2020													◇	◇	◇	◇												
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2021																	◇	◇	◇	◇								
Israeli Test Bed Experiments FY 2021																	◇	◇	◇	◇								
Arrow Weapon System Flight Test FY 2021																	◇	◇	◇	◇								
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2022																					◇	◇	◇	◇				
Israeli Test Bed Experiments FY 2022																					◇	◇	◇	◇				
Arrow Weapon System Flight Test FY 2022																					◇	◇	◇	◇				
Israeli Test Bed Experiments FY 2023																									◇	◇	◇	◇
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2023																									◇	◇	◇	◇
Arrow Weapon System Flight Test FY 2023																									◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD26 / <i>Israeli ARROW Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Israeli Test Bed Experiments FY 2017	1	2017	4	2017
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2017	1	2017	4	2017
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2018	1	2018	4	2018
Israeli Test Bed Experiments FY 2018	1	2018	4	2018
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2019	1	2019	4	2019
Israeli Test Bed Experiments FY 2019	1	2019	4	2019
Arrow Weapon System Flight Test FY 2019	1	2019	4	2019
Israeli Test Bed Experiments FY 2020	1	2020	4	2020
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2020	1	2020	4	2020
Arrow Weapon System Flight Test FY 2020	1	2020	4	2020
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2021	1	2021	4	2021
Israeli Test Bed Experiments FY 2021	1	2021	4	2021
Arrow Weapon System Flight Test FY 2021	1	2021	4	2021
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2022	1	2022	4	2022
Israeli Test Bed Experiments FY 2022	1	2022	4	2022
Arrow Weapon System Flight Test FY 2022	1	2022	4	2022
Israeli Test Bed Experiments FY 2023	1	2023	4	2023
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2023	1	2023	4	2023
Arrow Weapon System Flight Test FY 2023	1	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603913C / Israeli Cooperative Programs				Project (Number/Name) MD34 / Short Range Ballistic Missile Defense (SRBMD)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD34: Short Range Ballistic Missile Defense (SRBMD)	828.735	116.511	37.652	137.000	-	137.000	141.000	127.000	127.000	127.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This project code encompasses the Missile Defense Agency's (MDA) U.S.-Israeli cooperative program for the Israeli David's Sling Weapon System Program.

A. Mission Description and Budget Item Justification

Short Range Ballistic Missile Defense (SRBMD): SRBMD, also known as the David's Sling Weapon System (DSWS), is designed to counter short range rockets, cruise missiles, and tactical ballistic missiles and will be integrated into the Israeli Missile Defense Architecture adding another layer of defense to the current Arrow System. The David's Sling Weapon System (DSWS) includes the Stunner Interceptor, Missile Firing Unit (MFU), Multi-Mission Radar (MMR), Launch Site Controller (LSC), Data Link (DL), Elevated Sensor (ES), and the Golden Almond Battle Management Center (BMC).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: SRBMD Program	116.511	37.652	137.000
Articles:	-	-	-
<p>Description: The scope of the David's Sling Weapon System covers system development, testing, material procurement to include initial lot production, and integration of spiral software development for Blocks 1-3. Block 1 capability will enhance the short range rocket and missile defense capability. Block 2 will add capability to defend against medium range and cruise missiles. Block 3 will provide robust defense capability and add significant detection capability to the Israeli Air Defense Architecture. Recurring Accomplishments include:</p> <ul style="list-style-type: none"> - Conduct Testing of the DSWS <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> -Block 2 System Intercept Test to demonstrate initial cruise missile defense performance <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> -Conduct Block 2 System Intercept Test to demonstrate cruise missile defense performance -Continue Block 2 development for full cruise missile capability -Establish Interoperability with Israeli Air Missile Defense Network -Finalize Elevated Sensor development <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD34 / <i>Short Range Ballistic Missile Defense (SRBMD)</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
Additional Funding required to fully fund RDT&E to the levels associated with the MOU. Additional RDT&E funds were requested to be transferred from Procurement Funding to match the Israeli Programs continued development and production profiles for the FYDP. Funding for RDT&E and Procurement still remains within the \$500M defined in the MOU.				
Accomplishments/Planned Programs Subtotals		116.511	37.652	137.000
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
<p>The Short Range Ballistic Missile Defense (SRBMD), also known as the David's Sling Weapon System (DSWS) Project Agreement under the Research, Development, Test and Evaluation (RDT&E) Framework agreement between the U.S. and Israel creates a joint program office to manage this program. Missile Defense Agency (MDA) and the Israeli Ministry of Defense (IMoD) continue to implement management practices that allow for the more effective use of program management tools to ensure risk is adequately managed to include Knowledge Points that assess Israel's development progress. The DoD U.S. Israeli Cooperative Program Office jointly manages the SRBMD/DSWS program with IMoD to ensure that all systems are delivered in an effective manner, and meet the needs of the warfighter. The program is equitably funded between the U.S. and Israel. A portion of the Israeli cost share comes from non-financial contributions such as previously completed work prior to joint program initiation. Contracts are awarded by IMoD or MDA dependent on what is most advantageous to the Joint Governments. For the Stunner Interceptor, Rafael Advanced Systems (an Israeli company), subcontracts to Raytheon Missile Systems for Stunner interceptor components.</p>				
E. Performance Metrics				
N/A				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / Israeli Cooperative Programs	Project (Number/Name) MD34 / Short Range Ballistic Missile Defense (SRBMD)
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SRBMD Program - SRBMD Program	C/CPFF	Rafael : Israel	828.735	116.511	Dec 2016	37.652	Dec 2017	137.000	Dec 2018	-		137.000	Continuing	Continuing	Continuing
Subtotal			828.735	116.511		37.652		137.000		-		137.000	Continuing	Continuing	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD34 / <i>Short Range Ballistic Missile Defense (SRBMD)</i>
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Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	828.735	116.511	37.652	137.000	-	137.000	Continuing	Continuing	N/A

Remarks
Contract cost reflect U.S. contribution only.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD34 / <i>Short Range Ballistic Missile Defense (SRBMD)</i>
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	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	◆	◆	◆	◆																								
System Flight Test #5 FY 2017	◆	◆	◆	◆																								
System Flight Test #6 FY 2018									◇	◇	◇	◇																
System Flight Test #7 FY 2019									◇	◇	◇	◇																
System Flight Test #8 FY 2020													◇	◇	◇	◇												
System Flight Test #9 FY 2021																	◇	◇	◇	◇								
System Flight Test #10 FY 2022																					◇	◇	◇	◇				
System Flight Test #11 FY 2023																									◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603913C / <i>Israeli Cooperative Programs</i>	Project (Number/Name) MD34 / <i>Short Range Ballistic Missile Defense (SRBMD)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
System Flight Test #5 FY 2017	1	2017	4	2017
System Flight Test #6 FY 2018	1	2019	4	2019
System Flight Test #7 FY 2019	1	2019	4	2019
System Flight Test #8 FY 2020	1	2020	4	2020
System Flight Test #9 FY 2021	1	2021	4	2021
System Flight Test #10 FY 2022	1	2022	4	2022
System Flight Test #11 FY 2023	1	2023	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,669.751	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
MD04: <i>BMDs Test Development Program</i>	-	0.000	0.000	0.000	-	0.000	17.332	28.623	22.383	22.807	0.000	91.145
MT04: <i>BMDs Test Program</i>	1,590.659	271.143	298.918	342.457	-	342.457	308.160	268.978	274.085	281.012	Continuing	Continuing
MC04: <i>Cyber Operations</i>	4.253	9.539	2.528	8.619	-	8.619	8.716	8.815	8.914	8.914	Continuing	Continuing
MD40: <i>Program Wide Support</i>	74.839	13.759	14.747	14.605	-	14.605	15.180	14.493	14.950	14.851	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The FY 2018 to FY 2019 increase reflects the ABS (HALO) Fleet Renewal Program airframe replacement, test facility modernization upgrades and Continuous Integration/Continuous Agile Test (CI/CAT) planning beginning FY 2019. The FY 2017 to FY 2018 increase reflects the MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT required to address emergency warfighting requirements to fund Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test.

A. Mission Description and Budget Item Justification

MDA utilizes a disciplined system engineering process to develop and integrate the BMDs into an effective, layered defense against ballistic missiles of all ranges during all phases of flight. This process consists of the following steps: Plan, Define, Design, Build, Test and Verify, Assess, and Deliver BMDs Capability, followed by transfer of selected capabilities. The BMDs Test Program Element (PE) is responsible for testing that provides critical data to: determine validity of models and simulations used to verify and assess BMDs capabilities; validate that Elements and Components are properly designed, built, and integrated; and provide confidence that the BMDs will perform as designed. Results from the Test and Verify step provide feedback into the Plan, Define, and Design steps to identify areas for system improvements. Key to the systems engineering process is Modeling and Simulation (M&S), which reflects the integrated operational system's performance. Confidence in M&S is based on a comprehensive Verification, Validation, and Accreditation (VV&A) process. The BMDs Test Program, as documented in the Integrated Master Test Plan (IMTP), has a primary emphasis to provide the data necessary to verify and assess BMDs capabilities in support of Technical Capability Declarations, and to anchor BMDs M&S. As models are validated and accredited, MDA and the BMDs OTA Team will utilize these models to assess BMDs capabilities through a campaign of ground testing.

BMDs Test Program Functions include:

- Represent MDA as the single test authority to the test and evaluation community, international cooperative program representatives, and other organization representatives
- Develop and implement MDA test policy, standards, tools, products, and processes to enable effective tests while balancing MDA and element programmatic needs
- Develop an IMTP that compiles all MDA test objectives, test schedules, and funding requirements from the year of execution through the Future Years Defense Program time period and beyond (through FY 2027)
- Act as the single point of contact in MDA for all external ranges and common test resources

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>
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- Provide, maintain, and develop common test resources and infrastructure required to execute tests in the MDA Test Program by leveraging element laboratories, ranges, executing agents, and functional expertise, as applicable
- Certify that test personnel are trained and equipped to conduct safe and effective tests
- Provide test personnel and support services to plan and execute tests
- Collect, archive, and distribute all MDA test data/information

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	293.441	305.791	295.042	-	295.042
Current President's Budget	294.441	316.193	365.681	-	365.681
Total Adjustments	1.000	10.402	70.639	-	70.639
• Congressional General Reductions	-2.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	3.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	10.402	0.000	-	0.000
• Other Adjustment	0.000	0.000	70.639	-	70.639

Change Summary Explanation

The FY2019 increase from PB18 to PB19 reflects high priority test infrastructure initiatives in support of the Integrated Master Test Plan (IMTP).

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$10.402 million is required to address emergency warfighting requirements to fund Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>				Project (Number/Name) MD04 / <i>BMDS Test Development Program</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD04: <i>BMDS Test Development Program</i>	-	0.000	0.000	0.000	-	0.000	17.332	28.623	22.383	22.807	0.000	91.145
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The MD04 project executes in FY 2020 to support Continuous Integration/Continuous Agile Testing (CI/CAT), with planning in FY 2019 in the MT04 budget project.

A. Mission Description and Budget Item Justification

The BMDS Test Program will implement a Continuous Integration capability to support Continuous Agile Testing approach for integrated ground testing.

The BMDS Test Program will upgrade BMDS Integration and Development (BID) Lab and acquire additional BMDS Hardware-In-The-Loop simulation assets to support element pairwise and ensemble testing, provide test content flexibility and provide a venue to integrate the BMDS before entering formal ground tests (GT).

B. Accomplishments/Planned Programs (\$ in Millions)

N/A

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

The BMDS Test Program acquisition strategy is consistent with the MDA capabilities-based acquisition strategy that emphasizes testing, evolutionary acquisition, and knowledge-based funding. Test directs a team of various internal staff (government and scientific, engineering and technical assistance support), executing agents (including DoD agencies, Service Organizations, Laboratories and Program Offices, Federally Funded Research and Development Center (FFRDC), and other MDA programs) to execute the various diverse efforts within the BMDS test program through competition. When a specific effort/activity requires the use of an executing agent, respective headquarter regulations are used to conform the acquisition strategy.

The BMDS IMTP establishes and documents the test requirements for the BMDS with the specific focus on collecting the data needed for the Verification, Validation, and Accreditation (VV&A) of the BMDS Models and Simulations (M&S). This paradigm uses critical factor analysis to drive test design, planning, and execution for accrediting M&S, which is used to validate and assess system performance. With this test approach, MDA will establish confidence that the M&S used to evaluate the BMDS represent real world behavior, thereby enabling simulation-based performance assessment to verify system functionality.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MD04 / <i>BMDS Test Development Program</i>

<u>E. Performance Metrics</u> N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MD04 / <i>BMDS Test Development Program</i>

Remarks

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency						Date: February 2018									
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>				Project (Number/Name) MD04 / <i>BMDS Test Development Program</i>							
Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆	Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇						
Continuous Integration/Continuous Agile Testing (CI/CAT)				FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023					
							◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MD04 / <i>BMDS Test Development Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Continuous Integration/Continuous Agile Testing (CI/CAT)	1	2020	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>				Project (Number/Name) MT04 / <i>BMDS Test Program</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT04: <i>BMDS Test Program</i>	1,590.659	271.143	298.918	342.457	-	342.457	308.160	268.978	274.085	281.012	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The FY 2018 to FY 2019 increase reflects the ABS (HALO) Fleet Renewal Program airframe sensor replacement.

The FY 2017 to FY 2018 increase reflects the MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT required to address emergency warfighting requirements to fund Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test.

A. Mission Description and Budget Item Justification

The Test Program provides consolidated MDA capabilities and resources to support the management and execution of BMDS and Element-level testing.

The MDA Test Program is responsible for all BMDS testing and relies on BMDS Systems Engineering to provide the system test objectives that define the test architecture by developing, updating, coordinating, and assessing the IMTP. The MDA Test Program plans and executes BMDS test events and develops the necessary test policy, test plans, and test infrastructure to conduct an effective test program. The goals of this budget project are to sustain and improve a robust testing program and to enhance M&S efforts to provide, in conjunction with flight and ground testing, confidence to the Combatant Commanders that the missile defense system works.

Activities are grouped into six major areas: 1) Program Planning and Operations; 2) Flight Test; 3) Ground Test; 4) Test Infrastructure; 5) Engineering Test Analysis; and 6) USFK JEON.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Planning and Operations	104.408	100.203	85.841
Articles:	-	-	-
Description: The BMDS Test program is responsible for the following Program Planning and Operational activities:			
- Provide BMDS OTA System Team funding for civilian salaries and personnel support of system-level testing and conduct cybersecurity assessments of BMDS.			
- Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-328, *1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments			
- Serve as the MDA Test Interface/Liaison to the DOT&E, the DASD (DT&E), JFCC IMD, JITC and the Service OTAs.			
- Maintain a professional and diverse civilian workforce for flight and ground test support events.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDS Test Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Establish, maintain and execute the BMDS Test program budget. - Provide Integrated Master Test Plan cost modeling. - Provide day-to-day Test Functional Area (TFA) management. - Provide Test organizational property accountability. - Establish and standardize Test issuance documents. - Provide external interface services to support execution of the Ballistic Missile Defense System (BMDS) test program. - Manage Test contracting and acquisition activities as well as manpower activities- Ensure proper integration of contracts, support agreements; oversight and maintenance of the Test Directorate Inter/Intra-agency Acquisition Review (IAR) database. - Oversight and coordination of test policy guidance to ensure compliance and strategic synchronization across the Test Directorate and the MDA. - Manage travel, including travel to support IMTP flight and ground test events. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The FY2018 to FY 2019 decrease reflects realignment of BMDS Test priorities to Test Infrastructure (MT04) and MC04.</p>				
Title: Flight Test		9.394	17.096	51.822
Articles:		-	-	-
<p>Description: The Flight Test Execution program solely reflects the Integrated Master Test Plan (IMTP) cost model. The program integrates, manages, and executes flight tests using certified personnel and standardized processes and products to support Ballistic Missile Defense System (BMDS) fielding to the warfighter.</p> <ul style="list-style-type: none"> - Develop flight test training requirements for Test Directors and other console operators. - Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-328, *1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments. - Develop and manage the cybersecurity test organization including plans, policy and strategy, resources, and tracking of information and coordinating Cyber test schedules in support of Flight Tests. - Identify mission risks and implement mitigation practices as required ensuring safe and successful test outcomes. 				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDS Test Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Provide a Failure Response Team to ensure implementation of the response plan and capture lessons learned for process improvement. - Train test personnel for each flight test and maintain training records for all test personnel. - Train and resource System Mission Managers to lead Integrated Event Test Team mission management and readiness activities across all four test event phases for System and Element flight test and contingency operations. - Complete test planning for BMDS Flight Test events. - Conduct mission planning and range coordination activities; provide communications security equipment and management for BMDS Flight Test events. - Design and develop the Lessons Learned database. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: The increase from FY 2017 to FY 2018 reflects FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$10.402 million is required to address emergency warfighting requirements to fund Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test.</p> <p>Complete test planning for BMDS Flight Test events.</p> <p>FY 2019 Plans: Complete test planning for BMDS Flight Test events.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The FY 2018 to FY 2019 increase updated FTO-03 E2 resource and range requirements.</p>				
Title: Ground Test		6.282	10.102	17.116
		Articles: -	-	-
<p>Description: The Ground Test Execution program plans, designs, and executes BMDS ground tests in support of flight test risk reduction; BMDS fielding decisions; and Doctrine, Organization, Training, Materiel, Leadership and Education, and Personnel and Facilities (DOTMLPF) assessments. In addition, enables the warfighter to effectively employ, maintain, and sustain the BMDS and participate in the development of future missile defense capabilities through efficient ground testing. The Ground Test Execution program solely reflects the IMTP cost model.</p> <ul style="list-style-type: none"> - Conduct SPMTs as required to support BMDS Flight Test Risk Reduction Analysis. - Refine and continue development of the Ground Test Mission Directors, System Mission Manager and Mission Director training plan. 				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDS Test Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-328, *1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments.</p> <p>- Responsible for developing and managing the cybersecurity test organization including plans, policy and strategy, resources, and tracking of information and coordinating Cyber test schedules in support of the IMTP.</p> <p>- Develop and manage the cybersecurity test organization including plans, policy and strategy, resources, and tracking of information and coordinating Cyber test schedules in support of the IMTP.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <p>- The FY 2017 to FY 2018 increase reflects execution of additional IMTP ground test events, to include completion of Dry Run/Runs for Record for GTI-07b, GTI-067b and GTD-07b.</p> <p>- Continue to incorporate cybersecurity testing requirements into the BMDS ground tests to include planning for cyber requirements in FY 2019 GTD-07b test event.</p> <p>- Develop CONOPS to support Continuous Integration (CI)/ Continuous Agile Testing (CAT) emerging requirements, which begins execution in FY 2020.</p> <p>- Complete hardware and software testing, truth drivers and framework integration, formal execution runs and/or official data collection in support of GTI-07b (NORTHCOM/CENTCOM) and GTD-07b (USEUCOM/CENTCOM). Conduct planning activities for GTD-07b, and GT-08 campaign.</p> <p>- Complete test planning for BMDS Ground Test events.</p> <p>FY 2019 Plans:</p> <p>- Initiate planning for cyber requirements in FY 2020 GTD-08 (E/C) and GTD-08 (N/P) test events.</p> <p>- Finalize development of CONOPS to support CI/CAT emerging requirements, which begins execution in FY 2021.</p> <p>- Execute the following Ground Tests in FY 19: GTD-07b (NORTHCOM/CENTCOM), GTI-07c (NORTHCOM/CENTCOM), GTI-19 (USEUCOM/CENTCOM), and GTI-ISR (18) (International).</p> <p>- Initiate planning for the following Ground Test in FY20: GTI-08 (N/P) and CAT Sprints.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p> <p>The FY 2018 to FY 2019 increase reflects long lead time hardware purchases and new process development of CI/CAT in the Ground Test program.</p>				
Title: Test Infrastructure		123.671	131.636	162.574
Articles:		-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDS Test Program</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Description: The BMDS Test Program procures, maintains, and manages test resource infrastructure and provides all resources and requirements in support of a robust IMTP schedule in six primary functions:</p> <ol style="list-style-type: none"> 1) Flight Test Ranges 2) Sea Based Mobile Assets 3) Airborne Optics 4) Flight Test Communications 5) Ground Test Infrastructure 6) IMTP Development & Data Management <p>The primary function responsibilities are as follows:</p> <p>Flight Test Ranges:</p> <ul style="list-style-type: none"> - Maintain the MDA unique range facilities and mobile sensors, communication, data processing and dissemination infrastructure to support a broad spectrum of test requirements including metric tracking, target characterization, and multi-spectral imagery of BMDS phenomena. - Construct the new Wake Island communications facility and provide enhancements to the fiber backbone providing Flight Test Communications Network (FTCN) services to remote sites. <p>Sea Based Mobile Assets:</p> <ul style="list-style-type: none"> - Sea Based Systems (SBS) continued sustainment of test instrumentation ships, PACIFIC COLLECTOR and PACIFIC TRCKER, and associated telemetry and radar system. <p>Airborne Optics:</p> <ul style="list-style-type: none"> - Maintain and procure modified Gulfstream IIBs (HALOs) that collect radiometric and photo-documentary performance data for strategic and tactical defense systems flight and ground tests. - The key FY 2019 initiative is to replace the first ABS (HALO) Fleet Renewal Program sensor airframe. <p>Flight Test Communications:</p> <ul style="list-style-type: none"> - Provide operations and maintenance support for the Flight Test Communications Network at Wake Island. - Maintain accreditation for the Transportable Telemetry Systems (TTS), Pacific Collector Range Safety System (PCRSS), and the FTCN. <p>Ground Test Infrastructure:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDS Test Program</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>- Execute ground test planning activities supporting MDA test requirements and priorities to include test design, test integration, digital assessment, and international testing.</p> <p>- Maintain the hardware-in-the-loop (HWIL) Labs and communication test assets.</p> <p>IMTP Development & Data Management:</p> <ul style="list-style-type: none"> - Establish authority and maintain configuration control of the test baseline. - Develop, update, coordinate and deliver the IMTP, coordinated within MDA and External stakeholders (Director, Operational Test and Evaluation (DOT&E); the Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(DT&E)); the Joint Functional Component Command for Integrated Missile Defense (JFCC IMD); the Service Operational Test Agencies (OTAs)); and the Joint Interoperability Test Command (JITC)); and provides an affordable and executable test plan to meet Warfighter needs and National Security commitments. - Coordinate the IMTP Special Access Programs (SAP) Annex with respect to changes to SAP Program Test Baseline and synchronize with the collateral IMTP. - Manage the approved test baseline by assessing all proposed changes to the BMDS Test Schedule and Test Configurations for each BMDS test event identified in the IMTP. - Support the Developmental Baseline Reviews and the annual BMDS Accountability Reviews to assess baseline execution risk and verify BMDS components are consistent with the approved test baseline. - Update and maintain the classified Test Resource Mission Planning-Tool (TRMP-T(C)) database. - Execute Flight Test Design Analysis ensuring test designs are safe and sufficient to meet test objectives. - Develop and maintain integrated test tools to support Truth Data Requirements Documents, Truth Data Packages, on-site Truth Quick-Look product development, pre- and post-test analysis test planning, and resource de-confliction; Integrated Data Management Plans (IDMPs), Data Handling Plans (DHPs), Cybersecurity documentation, data planning and management, library operations, deployment process; infrastructure requirements process; and test operations support. - Provide analytical capability for Flight and Ground test planning to include: test design feasibility assessments, truth data and sensor analysis, truth data requirements documentation and data packages; flight safety analysis and flight safety data packages; and telemetry link margin, collision avoidance, and pre- and post-test trajectory analyses. - Review BMDS component programs' content on a quarterly basis to ensure consistency with the approved IMTP. - Maintain and extend the Directorate of Test Support System (DTSS) classified Computer Network Defense Service Provider (CNDSP) to support network cybersecurity defense for ground test network systems. Continue to define cybersecurity investments, risks and benefits used to reduce vulnerabilities and protect critical administrative and test data. - Maintain accreditation of the Orion Voice Switch Conferencing System (VSCS). - Co-Chair the Signature Working Group to review all signature models and identify technical limitations associated with radar and optical signatures used to support Ballistic Missile Defense System (BMDS) ground and flight testing. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDs Test Program</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Manage the Missile Defense Data Center (MDDC) Program and its library, operations, and infrastructure providing centralized data management, archival, and distribution services. - Maintain ARC infrastructure and networks, complete accreditation activities and ensure cyber compliance of all ARC enclaves. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: The FY 2017 to FY 2018 increase is due to early engineering for the replacement of the aging HALO and ABS Obsolete platforms to meet FAA requirements by FY 2020.</p> <ul style="list-style-type: none"> - Initiate Non-Recurring Engineering (NRE) for migration of Airborne Sensors airframes to two newer platforms. The NRE phase leads to the acquisition of one replacement aircraft in NLT FY 2019 and the acquisition of the second aircraft NLT FY 2020. After modifications and testing, the first aircraft will be ready for MDA test support in FY 2020 and the second in FY 2021. - Conduct mandatory intermediate dry-dock of Pacific Collector (Sep 2018) and Pacific Tracker (Jun 2018). - Initiate a plan for converting Pacific Tracker's main propulsion system from burning heavy Intermediate Fuel Oil to burning much lighter marine diesel fuel. - Build control room for Transportable Telemetry Systems (TTS) on Pacific Tracker to move operations out of below-deck trailers. - Replace Sea Tel secondary C-Band SATCOM antennas onboard Pacific Tracker and Pacific Collector to address End of Life (EoL). - Support all BMDs Hardware-in-the-Loop ground testing conducted in FY 2018 with the full complement of HWIL test assets located at the ARC. <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Begin modifications on the first Gulfstream-550 as part of the ABS (HALO) Fleet Renewal Program. - Design, test, and integrate the Airborne Sensors Primary Sensor replacement into the first Gulfstream-550. - Replace the Sea Tel primary C-Band SATCOM antennas onboard Pacific Tracker and Pacific Collector to address End of Life (EoL). - Implement a redundant communications hub at the MDA Integration and Operations Center (MDIOC). - Complete construction and initiate outfit of the new Wake Island Test Support Facility that will replace failing and condemned mission support facilities and consolidate multiple test support and test execution functions into a single facility. - Execute a phased repair and modernization project for the Meck Island Power Plant at the Reagan Test Site (RTS) in conjunction with a U.S. Army Garrison-Kwajalein (USAG-KA)/MDA project to establish a green, renewable power generation and distribution system. - Execute deferred test infrastructure sustainment and modernization projects consistent with Independent Facility Condition Assessments (FCAs) conducted at multiple BMDs Test Ranges. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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- Implement an Operation and Sustainment (O&S) program for a new launch infrastructure at Kauai Test Facility (KTF) to support future target launches using new target variants currently in design.

FY 2018 to FY 2019 Increase/Decrease Statement:

The FY 2018 to FY 2019 increase reflects ABS (HALO) Fleet Renewal Program improvements and test facility modernization upgrades.

Title: Engineering and Test Analysis

Articles:

27.388	30.381	25.104
-	-	-

Description: The Engineering and Analysis effort provides essential BMDS ground and flight test event planning, execution, and evaluation activities for each test event:

- Designing test architecture, defining test objectives and evaluation criteria, defining target requirements, and generating ground and flight test scenarios appropriate to the data collection requirements to assess BMDS performance and anchor Models and Simulations.
 - Producing the threat data for BMDS ground and flight tests.
 - Coordinating with BMDS OTA to address test issues, disposition them, coordinate them, with the OTA and recommend action plans to achieve closure.
 - Delivering HWIL M&S integration test cases.
 - Integrating, testing, functionally qualifying, and delivering end-to-end BMDS simulations supporting ground test missions.
 - Analyzing system-level interoperability.
 - Conducting modeling and technical analysis for Combatant Command wargames and exercises.
 - Utilizing M&S for pre-test assessment and post-test review, as well as M&S updates.
 - Providing test configuration management; risk assessments; and anomaly/deficiency review, assessment and closure.
 - Analyzing test results to identify verification and validation data collection shortfalls and reassigning objectives to future test events as required.
 - Documenting BMDS test observations for system-level test anomalies and coordinating the resulting BMDS Discrepancy Reports within the Failure Reporting, Analysis, and Corrective Action System (FRACAS)
 - Providing the Quick Look Brief, Mission Data Review (MDR), and Executive MDR.
- IMTP and infrastructure tasks include:
- Providing long-range BMDS IMTP planning and integration strategies related to overarching BMDS analysis product integration.
 - Upgrading test analysis tools in concert with the BMDS evolution (e.g., Modular Analysis and Reporting Suite (MARS)) to enhance analysis capability and efficiency.
 - Populating the MARS database with data from the most recently completed tests to support as-built analysis and capability assessments.

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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDS Test Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Providing engineering analysis process software to include System Coordination and Observation Reporting Environment (SCORE), Software Change Analysis Review Environment (SCARE), File Manager (FileMan), and ManPower Loading (MPL). - Incrementally improving and providing infrastructure, software, and MDA/IA compliance for the RApid Scenario Prototyping (RaSP) capability. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: FY 2018 increase keeps pace with projected FY 2018-FY 2022 IMTP events. - Validate test event data collection and conduct post-test analyses supporting the EPAA Phase 3 Technical Capability Declaration.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects the consolidation of Non-MDA Element (NME) test engineering support to Program Element 0603890C.</p>				
Title: USFK JEON		0.000	9.500	0.000
Description: The FY 2017 to FY 2018 increase reflects the MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT required to address emergency warfighting requirements to fund Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test.		Articles: -	-	-
<p>FY 2018 Plans: The MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT required to address emergency warfighting requirements to fund Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test.</p> <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
Accomplishments/Planned Programs Subtotals		271.143	298.918	342.457

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To	
			Base	OCO	Total					Complete	Total Cost
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing

Remarks

D. Acquisition Strategy

The BMDS Test Program acquisition strategy is consistent with the MDA capabilities-based acquisition strategy that emphasizes testing, evolutionary acquisition, and knowledge-based funding. Test directs a team of various internal staff (government and scientific, engineering and technical assistance support), executing agents (including DoD agencies, Service Organizations, Laboratories and Program Offices, Federally Funded Research and Development Center (FFRDC), and other MDA programs to execute the various diverse efforts within the BMDS test program through competition. When a specific effort/activity being conducted, acquired, or maintained requires the use of an executing agent, respective headquarter regulations are used to conform the acquisition strategy.

The MDA IMTP establishes and documents the test requirements for the BMDS with the specific focus on collecting the data needed for the Verification, Validation, and Accreditation (VV&A) of the BMDS Models and Simulations. This paradigm uses critical factor analysis to drive test design, planning, and execution for accrediting M&S, which is used to validate and assess system performance. With this test approach, MDA will establish confidence that the M&S used to evaluate the BMDS represent real world behavior, thereby enabling simulation-based performance assessment to verify system functionality.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDS Test Program</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Planning and Operations - IMTP Planning and Data Management Tools	C/FP	None : AL	109.224	9.141	Oct 2016	21.723	Feb 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Program Planning and Operations - Lab Analysis Infrastructure	MIPR	MIT-LL/Aerospace : AL/CA/MA	55.119	10.026	Oct 2016	8.059	Feb 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Program Planning and Operations - Operational Test Agency	MIPR	ATEC/Aberdeen Proving Grounds : MD	67.719	16.367	Oct 2016	13.166	Feb 2018	23.310	Nov 2018	-		23.310	Continuing	Continuing	Continuing
Program Planning and Operations - Support to Flight Testing	C/CPAF	Northrop Grumman/ Lockheed Martin : AL/CO	41.287	18.964	Oct 2016	12.571	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
0400 / 4				PE 0603914C / Ballistic Missile Defense Test				MT04 / BMDS Test Program							
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Planning and Operations - Support to Ground Testing	C/CPAF	MDIOC/JRDC/ Northrop Grumman : AL/CO/VA/DC	15.117	7.913	Oct 2016	5.645	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Program Planning and Operations - Support to Test Resources	C/CPAF	None : MiDAESS/AL	20.020	6.595	Oct 2016	4.354	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Program Planning and Operations - Test Functional Management Office	C/CPFF	None : MDA/ MiDAESS/AL/VA/ CO/MA	282.100	35.402	Oct 2016	34.685	Mar 2018	62.531		-		62.531	Continuing	Continuing	Continuing
Flight Test - IMTP Flight Testing	MIPR	Air & Missile Def Command/AFGSC/ H'ville Operations Support Center/ NAWC/NRL/Ronald Reagan Test Site /SPAWAR/ Vandenberg AFB/ White Sands Missile Range/AMRDEC/ NSWC/PMRF/611th CES/611th ASUS/ AEDC : AL/CA/CO/ HI	235.612	9.394	Oct 2016	17.096	Oct 2017	51.822	Oct 2018	-		51.822	Continuing	Continuing	Continuing
Ground Test - IMTP Ground Testing	MIPR	Aviation & Missile Research & Development/LTPO/ Space & Naval Warfare Command : AL/CO/CA	42.862	6.282	Oct 2016	10.102	Oct 2017	17.116	Oct 2018	-		17.116	Continuing	Continuing	Continuing
Test Infrastructure - Ground Test Infrastructure	MIPR	Space and Naval Warfare Command : AL/CA	19.899	3.694	Oct 2016	3.908	Nov 2017	35.648	Nov 2018	-		35.648	0.000	63.149	0.000
Test Infrastructure - Airborne Optics Mobile Assets	C/IDIQ	None : L3/JHU/APL/ TX/MD/AZ/TN	87.809	17.504	Oct 2016	17.014	Feb 2018	69.584	Feb 2019	-		69.584	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDS Test Program</i>
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Infrastructure - Core Ground Test Labs and HWILS	C/IDIQ	None : Colsa/AMRDEC/AL/MD/FL/CA/OH/CO	141.238	26.503	Oct 2016	28.675	Feb 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Test Infrastructure - Enhanced GT Capability Assets	C/IDIQ	None : Colsa/Boeing/NG/AL/CO/FL/MD/HI	27.828	3.836	Oct 2016	7.759	Feb 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Test Infrastructure - Facilities Sustainment, Restoration & Modernization	MIPR	SMDC/Northrup Grumman/Colsa : AL/CO/NM	12.028	3.775	Oct 2016	4.543	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Test Infrastructure - Flight Test Communications	C/IDIQ	ASI/WSMR : Gray Research/NRL/NAWC/CA/MD/NCR/NM/AL/MA	82.884	15.368	Oct 2016	12.751	Nov 2017	16.773	Nov 2018	-		16.773	Continuing	Continuing	Continuing
Test Infrastructure - Flight Test Ranges	C/IDIQ	SMDC/SNL/PMRF : NAWC/WSMR/AMRDEC/NG/AK/AL/CA/HI/NM/CO	69.330	8.143	Oct 2016	11.862	Nov 2017	11.280	Nov 2018	-		11.280	Continuing	Continuing	Continuing
Test Infrastructure - IMTP Planning & Data Management Tools	C/FP	None : AL	0.000	0.000		0.000		16.430	Nov 2018	-		16.430	Continuing	Continuing	Continuing
Test Infrastructure - Sea Based Mobile Assets	MIPR	None : MARAD/NAWC/Hanscom AFB/AL/CA/MD/NCR/NM/MA	68.427	13.504	Oct 2016	12.528	Nov 2017	12.859	Nov 2018	-		12.859	Continuing	Continuing	Continuing
Test Infrastructure - Support to Test Resources	MIPR	None : MiDAESS/AL	114.760	31.344	Oct 2016	32.596	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering and Test Analysis - CSS Support	C/CPFF	TEAMS : AL	18.431	6.009	Nov 2016	4.079	Nov 2017	4.162	Nov 2018	-		4.162	Continuing	Continuing	Continuing
Engineering and Test Analysis - FFRDA/UARC 2	MIPR	Aerospace : CA	0.755	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering and Test Analysis - FFRDC/UARC	MIPR	MITRE : VA	3.187	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency											Date: February 2018				
Appropriation/Budget Activity 0400 / 4						R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>					Project (Number/Name) MT04 / <i>BMDS Test Program</i>				

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering and Test Analysis - Industry Support	C/CPAF	Boeing : AL	20.038	2.409	Nov 2016	1.856	Nov 2017	2.467	Nov 2018	-		2.467	Continuing	Continuing	Continuing
Engineering and Test Analysis - Industry Support - NME	C/CPAF	Northrop Grumman-JRDC : CO, AL	0.000	0.000		1.848	Nov 2017	0.350	Nov 2018	-		0.350	Continuing	Continuing	Continuing
Engineering and Test Analysis - OGA Support	MIPR	AMRDEC : AL	54.985	16.618	Nov 2016	19.836	Nov 2017	18.125	Nov 2018	-		18.125	Continuing	Continuing	Continuing
Engineering and Test Analysis - OGA Support - NME	MIPR	LTPO : AL	0.000	2.352	Nov 2016	2.762	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
USFK JEON - USFK JEON	SS/IDIQ	Lockheed Martin : Sunnyvale, CA/ Huntsville, AL	0.000	0.000		9.500	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			1,590.659	271.143		298.918		342.457		-		342.457	Continuing	Continuing	N/A

Remarks

Recategorized and streamlined BMDS Test cost category content to better align test priorities.

Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,590.659	271.143	298.918	342.457	-	342.457	Continuing	Continuing	N/A

Remarks

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDS Test Program</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇

	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
IMTP v19.1 flight and ground test event details are at a higher classification.	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MT04 / <i>BMDS Test Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MC04 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC04: <i>Cyber Operations</i>	4.253	9.539	2.528	8.619	-	8.619	8.716	8.815	8.914	8.914	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The BMDS Test Cyber Operations sustain Missile Defense Agency Risk Management Framework (RMF) Standards, Computer Network Defense Service Provider and Controls Validation Testing activities; analysis of validation results; risk assessments and reviews of proposed Program Manager/Information Systems Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA Ballistic Missile Defense Test program. It maintains the Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, and Cybersecurity Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and POA&M on all MDA information systems. This project supports the monitoring and tracking of Cybersecurity mitigations detailed in Information Technology security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Systems Security Officer/Security Controls Assessor (SCA) and AO. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Systems Modernization Act (FISMA) of 2014. The MDA Information Technology Networks and Systems (ICTA) and Cross Domain Solution (CDS) provide oversight and guidance for implementing standard CDS security policies across the BMDS. The Network Operations Security Center (DNOSC) is the Local Control Center (LCC) (Tier 3) that protects, detects, characterizes, reports, and mitigates cyber threats through real-time continuous monitoring for flight and ground test assets.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Network / System Certification and Accreditation (C&A)	9.539	2.528	8.619
Articles:	-	-	-
Description: The BMDS Test Network/System Certification and Accreditation program will:			
<ul style="list-style-type: none"> - Provide cyber security program oversight of all MDA Test Directorate (DT) information systems, networks, sponsored remote sites, ground and flight test infrastructure, and exercise/war game infrastructures. This includes management of: cyber security compliance and authorization; cyber security training and awareness; information system secure configuration; assessment and incident management; and computer network defense. - Fund Ballistic Missile Defense Test Program Information Systems Security Manager (ISSM) civilian salaries. - Conduct cyber security/information assurance engineering and architecture planning for the BMDS Test Program information technology systems. - Plan and test the Cybersecurity controls for BMDS. - Develop DT NIST certification and accreditation packages. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MC04 / <i>Cyber Operations</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Leverage Cross Domain Solution (CDS) as single authority implementing standard security policies for test and across the BMDS.</p> <p>- Maintain and extend the Support System (DTSS) classified Computer Network Defense Service Provider (CNDSP) to support network cyber security defense for ground test network systems.</p> <p>- Continue to define cyber security investments, risks and benefits used to reduce vulnerabilities and protect critical administrative and test data.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The FY 2018 to FY 2019 increase reflects hardware and software upgrades to improve cybersecurity posture and transfers Directorate of Test Support System (DTSS) and Cross Domain Solution (CDS) costs from MT04 Test Infrastructure budget project to more accurately report Cyber security related activities.</p>				
Accomplishments/Planned Programs Subtotals		9.539	2.528	8.619
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
N/A				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MC04 / <i>Cyber Operations</i>
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network / System Certification and Accreditation (C&A) - Cybersecurity Civ	MIPR	MDA : Various	0.778	0.446		0.330	Oct 2017	0.345	Nov 2018	-		0.345	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Cyersecurity Support	C/IDIQ	Torch Technologies : Various	3.475	2.155		2.198	Oct 2017	2.233	Oct 2018	-		2.233	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - DNOSC	MIPR	Teledyne Brown/ AMRDEC : AL	0.000	6.938		0.000		6.041	Oct 2018	-		6.041	Continuing	Continuing	Continuing
Subtotal			4.253	9.539		2.528		8.619		-		8.619	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.253	9.539	2.528	8.619	-	8.619	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MC04 / <i>Cyber Operations</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																												
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																												
					FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
MC04 Cyber Operations					◇◇◇◇				◇◇◇◇				◇◇◇◇				◇◇◇◇				◇◇◇◇				◇◇◇◇							

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MC04 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC04 Cyber Operations	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program Wide Support</i>	74.839	13.759	14.747	14.605	-	14.605	15.180	14.493	14.950	14.851	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
 Program Wide Support reflects proportional changes as a result of budget changes to the Ballistic Missile Defense Test program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	13.759	14.747	14.605
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	13.759	14.747	14.605

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy N/A		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	3.730	1.393	Jul 2017	0.295	Jul 2018	0.221	Jul 2019	-		0.221	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	69.059	10.826	Aug 2017	9.887	Aug 2018	10.700	Mar 2019	-		10.700	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance - SRM	MIPR	Various : Multi: AK,AL,CA,VA	2.050	1.540		4.565	Nov 2017	3.684	Mar 2019	-		3.684	Continuing	Continuing	Continuing
Subtotal			74.839	13.759		14.747		14.605		-		14.605	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	74.839	13.759	14.747	14.605	-	14.605	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆					
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇					
			FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
MD40 Program-Wide Support			◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,993.081	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing
MC05: <i>Cyber Operations</i>	0.065	0.116	0.251	0.351	-	0.351	0.915	1.078	1.068	1.401	0.000	5.245
MT05: <i>BMDS Targets Program</i>	1,917.633	496.730	441.657	501.037	-	501.037	423.308	365.357	385.914	397.457	Continuing	Continuing
MD40: <i>Program Wide Support</i>	75.383	24.938	18.217	16.464	-	16.464	17.604	17.304	18.927	18.942	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The increase in FY 2019 reflects adjustments due to re-phasing and balancing events in the BMDS Integrated Master Test Plan.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$49.700 million is required to address emergency warfighting readiness requirements to fund Phase 1, 2 and 3 efforts in support of USPACOM Joint Emergent Operational Need Statement (JEON), Aegis SM-3 Block IIA Missile Test, and risk reduction for additional 20 GBIs, including addition of a non-intercept target for CTV-03 in FY 2020 and acceleration of software builds and component qualification prior to critical design review.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System (BMDS) Targets Program provides centrally managed targets and countermeasures development and procurement for a cost effective, integrated system-level approach to BMDS testing. The Targets Program has realized past and future savings by centralized competition and management of targets and countermeasures using efficient acquisition strategies and lot buys resulting in economies of scale. Based on engineering assessments of threat intelligence data, the BMDS Targets Program develops, builds, and supports the launch of Short Range Ballistic Missile (SRBM: Less than 1000 Kilometer range) targets, Medium Range Ballistic Missile (MRBM: 1000-3000 Kilometer Range) targets, Intermediate Range Ballistic Missile (IRBM: 3000-5500 Kilometer Range) targets, Intercontinental Ballistic Missile (ICBM: Greater than 5500 Kilometer range) targets, and Multi-Class Components to test, verify, and validate the performance of the BMDS against threats. MDA's BMDS Targets Program provides an economical and reliable inventory of targets which are representative of feasible future threats and support demonstration of the capability of the evolving layered missile defense system in a simultaneous test and operations threat environment.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$49.700M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+\$9.900M Project MT05 BMDS Targets Program is required to fund target development and build to support Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON), which will deliver an integrated Upper Tier (THAAD and Aegis BMD), and Lower Tier (PAC3 Missile Segment Enhancement (MSE)) ballistic missile defense system that expands engagement options and increases coverage area. This is a base budget requirement.

+\$33.700M Project MT05 BMDS Targets Program is required to fund an SM-3 IIA flight test, in FY19, to demonstrate a capability against threat target in support of homeland defense.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>
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+\$6.100M Project MT05 BMDS Targets Program is required for risk reduction for additional 20 GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	563.576	410.425	373.203	-	373.203
Current President's Budget	521.784	460.125	517.852	-	517.852
Total Adjustments	-41.792	49.700	144.649	-	144.649
• Congressional General Reductions	-44.421	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	9.300	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-6.671	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	49.700	0.000	-	0.000
• Other Adjustment	0.000	0.000	144.649	-	144.649

Change Summary Explanation

The increase in FY2019 from PB18 to PB19 reflects re-phasing of funding for events in the BMDS Integrated Master Test Plan.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$49.700 million is required to address emergency warfighting readiness requirements to support USPACOM Joint Emergent Operational Need Statement (JEON), Aegis SM-3 Block IIA Missile Test, and risk reduction for additional 20 GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MC05 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC05: <i>Cyber Operations</i>	0.065	0.116	0.251	0.351	-	0.351	0.915	1.078	1.068	1.401	0.000	5.245
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project MC05 is the Defensive Cyber Operations Project established in this Program Element (PE) during PB 2018. Funds were previously reported in Project MT05 of this PE.

A. Mission Description and Budget Item Justification

Defense Cyber Operations sustains Missile Defense Agency DoD Information Assurance Certification and Accreditation Program (DIACAP), Risk Management Framework Standards, Computer Network Defense Service Provider and Controls Validation Testing activities; analysis of validation results; risk assessments and reviews of proposed Program Manager/Information Assurance Manager (PM/IAM) Plans of Action and Milestones (POA&Ms) for MDA Ballistic Missile Defense Test program. It maintains the Certification and Accreditation (C&A) data repository, capturing the DIACAP documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&M on all MDA information systems. This project supports the monitoring and tracking of Cybersecurity mitigations detailed in Information Technology security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Assurance Officer/Certification Authority (CA) and DAA. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Network / System Certification and Accreditation (C&A)	0.116	0.251	0.351
Articles:	-	-	-
<p>Description: The Network/Systems Certification and Accreditation project sustains the MDA DoD Information Assurance Certification and Accreditation Program (DIACAP) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance Manager (PM/IAM) Plans of Action and Milestones (POA&Ms) for MDA Command and Control Battle Management and Communications (C2BMC) mission systems. It maintains the Certification and Accreditation (C&A) data repository, capturing the DIACAP documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority [DAA] accreditation decisions) and POA&M on all MDA information systems.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Conducted cyber security and information assurance engineering and architecture planning for Targets technology systems - Planned and tested the information assurance controls for Targets systems 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MC05 / <i>Cyber Operations</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- Developed Technology Maturation Initiatives DoD Information Assurance Certification and Accreditation Program certification and accreditation packages <i>FY 2019 Plans:</i> - SEE ABOVE. <i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> The increase in FY2019 from FY 2018 reflects re-phasing of cyber security being executed prior in MT05.			
Accomplishments/Planned Programs Subtotals	0.116	0.251	0.351

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MC05 / <i>Cyber Operations</i>
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network / System Certification and Accreditation (C&A) - Information Assurance 1	MIPR	Missile Defense Agency : Huntsville, AL	0.038	0.060		0.121	Nov 2017	0.163	Nov 2018	-		0.163	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Information Assurance 2	C/IDIQ	MiDAESS/TEAMS : Various	0.027	0.056		0.130	Nov 2017	0.188	Nov 2018	-		0.188	Continuing	Continuing	Continuing
Subtotal			0.065	0.116		0.251		0.351		-		0.351	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.065	0.116	0.251	0.351	-	0.351	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MC05 / <i>Cyber Operations</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																					
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																					
					FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
MC05 Cyber Activities					◇ ◇ ◇ ◇			◇ ◇ ◇ ◇			◇ ◇ ◇ ◇			◇ ◇ ◇ ◇			◇ ◇ ◇ ◇			◇ ◇ ◇ ◇					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MC05 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC05 Cyber Activities	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT05: <i>BMDS Targets Program</i>	1,917.633	496.730	441.657	501.037	-	501.037	423.308	365.357	385.914	397.457	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The increase in FY2019 reflects adjustments due to re-phasing of events in the BMDS Integrated Master Test Plan and includes reduced contract spending for Mission Support Services in accordance with Department Service Requirement Review Board reductions through increased competition.

A. Mission Description and Budget Item Justification

The mission of the MDA BMDS Targets program is to provide an economical and reliable inventory of targets that are representative of feasible future threats. These targets enable demonstration of the evolving layered missile defense system capability in operationally realistic scenarios. The BMDS Targets Program develops and acquires four target types across four target classes. The classes include: Short Range Ballistic Missiles (SRBM), Medium Range Ballistic Missiles (MRBM), Intermediate Range Ballistic Missiles (IRBM), and Intercontinental Ballistic Missiles (ICBM). The target types (Type 1-4) designate the complexity of the target within its class. Type-1 targets are simple baseline configurations. Type-2 targets have increased capability or complexity. Type-3 targets have unique configurations. Type-4 targets are low-cost, subscale targets.

The BMDS Targets Program develops and provides Modified Ballistic Re-Entry Vehicles (MBRV) and Countermeasures that can be used across the spectrum of target types and classes. The BMDS Targets Program provides target digital models that enable MDA weapon system program offices to simulate end to end sensor and interceptor performance during pre-mission analysis. The BMDS Targets Program also provides maintenance, aging surveillance, refurbishment, and routine testing of government furnished equipment boosters and target components.

The BMDS Targets Program carefully plans the year of execution to assure the best use of appropriated funds. However, the BMDS Targets Program must be flexible in its execution of the program in order to respond to emerging real world threats or changes in the intelligence community estimates of when a threat will be deployed. The Targets Program must also work with BMDS systems engineers on a continuing basis to align the targets program to the BMDS capabilities as reflected in MDA's Integrated Master Test Plan (IMTP). The BMDS Targets Program makes every effort to reduce instability in contracts, production base and budget while managing in this dynamic work environment.

The BMDS Targets Program develops and builds targets and countermeasures at multiple locations including: Courtland, AL; Orlando, FL; Huntsville, AL; and Chandler, AZ. Storage and maintenance facilities are also located throughout the country including: Huntsville, AL; White Sands, NM; Ogden, UT; Tooele, UT; Cape Canaveral Air Force Station, FL, and Courtland, AL.

The BMDS Targets Program consists of four major areas: Consumables, Program Planning and Operations, Resources, and Flight Test Execution.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Title: Consumables - Short Range Ballistic Missiles (SRBM)</p> <p align="right">Articles:</p> <p>Description: Consumables include SRBM target hardware development and manufacturing.</p> <p>Target development includes non-recurring engineering, MBRVs, Countermeasures, and launch support equipment for BMDS flight testing. Target development provides air, sea, and ground launch capabilities to maximize flexibility in MDA test design. Development activities include requirements decomposition, design, modeling and simulation, qualification testing, and characterization. The BMDS Targets Program Office manages target configuration, component interface specifications, range integration, reliability, mission assurance, and costs. The BMDS Targets Program ensures target designs are producible, reliable, and affordable.</p> <p>Target manufacturing includes the build of targets and target components that are required to execute the BMDS IMTP. Manufacturing includes government furnished equipment and new component acquisition, assembly, and integration. Also included are target characterization, quality and mission assurance, transportation, and logistics support. The BMDS Targets Program delivers fully assembled and integrated targets to the BMDS Test Program. Future revisions to the IMTP will likely affect target types and quantities noted in the Planned Accomplishments.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Decrease is due to the final efforts related to the ARAV-G targets. Note: Because Aegis Readiness Assessment Vehicle (ARAV) targets are being used for additional programs beyond Aegis BMD, beginning in FY 2018, targets previously given the ARAV prefix will be renamed Short Range Ballistic Missile (SRBM) Type 4 (SRBM T4), with an identifier after the T4 to show specifically which type of target is being built. For example, former ARAV-G type targets will now be known as SRBM T4-G targets. -Short Range Ballistic Missile T4-G (SRBM T4-G) - continue manufacturing Ship Set 2 to support pre-ship readiness review and flight test in FY 2019 -Initiate competitive award for future low-cost targets -Develop and manufacture additional SRBMs, MBRVs, and Countermeasures, as required by the BMDS IMTP</p> <p>FY 2019 Plans: -Short Range Ballistic Missile T4-G (SRBM T4-G) - deliver Ship Sets 1 and 2 to support pre-ship readiness reviews and flight tests in FY 2019</p>	22.956	9.168	29.832
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>-SRBM T4-B - deliver Ship Set 25 to support a pre-ship readiness review and flight test in FY 2019; continue manufacture of Ship Set 26 to support a pre-ship readiness review in FY 2020</p> <p>-Award contract and initiate development of future low-cost targets to include initiation of SRBM T4-B manufacture of Ship Sets 1, 2, and 3 to support pre-ship readiness reviews in FY 2022</p> <p>-Develop and manufacture additional SRBMs, MBRVs, and Countermeasures, as required by the BMDS IMTP</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 is due to the award and initial development efforts associated with the future low-cost targets contract.</p>				
<p>Title: Consumables - Medium Range Ballistic Missiles (MRBM)</p> <p>Description: MRBM target hardware development and manufacturing is consistent with the Description found in the Consumables-SRBM section. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Decrease is due to reduced non-recurring engineering efforts for the MRBM T1/T2 and the MRBM T3C2 targets. -MRBM Type 3 Configuration 2 (MRBM T3C2) - continue non-recurring engineering design and development of MRBM T3C2; continue manufacturing of Ship Set 5 and 6 for delivery in FY 2018 (Ship Set 5) and FY 2019 (Ship Set 6) and flight tests in FY 2019 -MBRV-7 - continue recurring engineering efforts; deliver MBRV-7 front section to support MRBM T1/T2 Ship Set 3; continue manufacturing MBRV-7 front sections to support MRBM T1/T2 Ship Sets 4-6 -MRBM T1/T2 - continue non-recurring engineering efforts; continue manufacturing Ship Set 1 to support first target acceptance review and pre-ship readiness review in FY 2019; continue manufacturing of Ship Sets 2-6 to support pre-ship readiness reviews in FY 2019 (Ship Set 2), FY 2021 (Ship Set 3), FY 2022 (Ship Set 4), and FY 2023 (Ship Sets 5 and 6) -Competitively award effort for MRBM Countermeasure development and build. -Competitively award effort for MRBM Re-Entry Vehicle development and build. -Develop and manufacture additional MRBMs, Re-Entry Vehicles, and Countermeasures, as required by the BMDS IMTP</p> <p>FY 2019 Plans: -MRBM Type 3 Configuration 2 (MRBM T3C2) - deliver Ship Set 6 to support a flight test in FY 2019, continue manufacture of Ship Set 7 to support a pre-ship readiness review and flight test in FY 2021 -MBRV-7 - continue recurring engineering efforts; deliver MBRV-7 front section to support MRBM T1/T2 Ship Set 4; continue manufacturing MBRV-7 front sections to support MRBM T1/T2 Ship Sets 5 and 6</p>		130.547	99.952	107.888
Articles:		-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>-MRBM T1/T2 - complete non-recurring engineering efforts; deliver Ship Set 1 to support first target acceptance review and pre-ship readiness review in FY 2019; continue manufacturing of Ship Sets 2-4 to support pre-ship readiness reviews in FY 2022 (Ship Set 2) and FY 2023 (Ship Sets 3 and 4)</p> <p>-MRBM T4 - continue manufacture of Ship Sets 5-7 to support flight tests in FY 2021; initiate manufacture of Ship Set 8 to support a pre-ship readiness review in FY 2021</p> <p>-Continue non-recurring engineering efforts for the MRBM Re-Entry Vehicle development and build</p> <p>-Develop and manufacture additional MRBMs, Re-Entry Vehicles, and Countermeasures, as required by the BMDS IMTP</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>			
<p>Title: Consumables - Intermediate Range Ballistic Missiles (IRBM)</p> <p align="right">Articles:</p> <p>Description: IRBM target hardware development and manufacturing is consistent with the Description found in the Consumables-SRBM section. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Decrease is due to major hardware purchases being completed in FY 2017.</p> <p>-IRBM T1/T2 - deliver Ship Sets 6 and 7 to support flight tests in FY 2018; deliver Ship Sets 8 and 9 to support flight tests in FY 2019; continue manufacturing and integration of Ship Sets 10-16 to support pre-ship readiness reviews in FY 2020 (Ship Sets 10 and 11), FY 2021 (Ship Sets 12), FY 2022 (Ship Sets 13 and 14), and FY 2023 (Ship Sets 15 and 16)</p> <p>-MBRV-8 - deliver Ship Sets 4 and 5 to support flight tests in FY 2018; deliver Ship Sets 6 and 7 to support flight tests in FY 2019; perform additional characterization on the MBRV-8</p> <p>-Competitively award effort for IRBM Countermeasures</p> <p>-Competitively award effort for IRBM aeroshells</p> <p>-Initiate build of an additional, non-intercept target for the Ground Based Midcourse CTV-03 test in FY 2020</p> <p>-Develop and manufacture additional IRBMs, Re-Entry Vehicles, and Countermeasures, as required by the BMDS IMTP</p> <p>FY 2019 Plans: -IRBM T1/T2 - continue manufacturing and integration of Ship Sets 10-18 to support pre-ship readiness reviews in FY 2019 (Ship Set 10), FY 2020 (Ship Set 11), FY 2021 (Ship Sets 12 and 13), FY 2022 (Ship Sets 14 and 15), and FY 2023 (Ship Sets 16, 17 and 18)</p> <p>-MBRV-8 - perform additional characterization on the MBRV-8</p> <p>-Initiate development efforts on the competitively awarded IRBM Countermeasures contract</p>	121.986	74.659	124.346
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>-Continue build of an additional, non-intercept target for the Ground Based Midcourse CTV-03 test in FY 2020</p> <p>-Develop and manufacture additional IRBMs, Re-Entry Vehicles, and Countermeasures, as required by the BMDS IMTP</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects addition of countermeasures development efforts and final hardware purchases for IRBM T1/T2 Ship Sets 13-16.</p>				
<p>Title: Consumables - Intercontinental Ballistic Missiles (ICBM)</p> <p align="right">Articles:</p> <p>Description: ICBM target hardware development and manufacturing is consistent with the Description found in the Consumables-SRBM section. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Increase is due to additional funds added to provide Aegis an ICBM target</p> <ul style="list-style-type: none"> -ICBM T1/T2 - continue manufacturing Ship Set 3, 4, and 5 to support pre-ship readiness reviews in FY 2021 (Ship Set 3), FY 2022 (Ship Set 4), and FY 2023 (Ship Set 5) -MBRV-8 - continue performing characterization on the MBRV-8 -Continue integration of the ICBM Ground Test Missile used as a pathfinder for the Concept of Operations -Competitively award ICBM T2CU effort -Initiate efforts to provide an ICBM target for an Aegis SM-3 Block IIA Missile Test -Develop and manufacture additional ICBMs, Re-Entry Vehicles, and Countermeasures, as required by the BMDS IMTP <p>FY 2019 Plans: -ICBM T1/T2 - continue manufacturing Ship Set 3, 4, and 5 to support pre-ship readiness reviews in FY 2020 (Ship Set 3), FY 2021 (Ship Set 4), and FY 2022 (Ship Set 5)</p> <ul style="list-style-type: none"> -MBRV-8 - continue performing characterization on the MBRV-8 -Continue efforts to provide an ICBM target for an Aegis SM-3 Block IIA Missile Test -Develop and manufacture additional ICBMs, Re-Entry Vehicles, and Countermeasures, as required by the BMDS IMTP <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>		57.414	86.543	86.069
		-	-	-
<p>Title: Consumables - Joint Emergent Operational Need Statement (JEON)</p> <p align="right">Articles:</p> <p>Description: Target development and build to support Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent</p>		0.000	9.900	0.000
		-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>Operational Need Statement (JEON), which will deliver an integrated Upper Tier (THAAD and Aegis BMD), and Lower Tier (PAC3 Missile Segment Enhancement -MSE) ballistic missile defense system that expands engagement options and increases coverage area.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: -Initiate Phase 1, 2 and 3 efforts in support of USPACOM Joint Emergent Operational Need Statement (JEON) to include initial funds for launch vehicle and re-entry vehicle buys</p> <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
<p>Title: Program Planning & Operations</p> <p align="right">Articles:</p> <p>Description: Program Planning and Operations provides for government management of the Targets program. Included in this effort is program and business management, program administration, technical and testing oversight, verification of hardware and software development, government manpower and infrastructure to develop, test and sustain the BMDS Targets Program Office system and components. Other Government Agency and Federally Funded Research and Development Research Centers are used for highly specialized skill sets not available internal to Targets for specific time periods. Specific yearly accomplishments include the following:</p> <ul style="list-style-type: none"> -Provide technical and business management support activities, financial management, cost and schedule performance analysis cost estimation and analysis, and integration activities -Provide program oversight, subcontract management, quality assurance, verification of hardware and software development, and technical and testing oversight -Ensure Targets and Countermeasures program compliance with internal and external direction, policies, and regulations -Conduct Internal Program Plans that align with the MDA approved IMTP -Provide program and technical management of target launch operations activities to include oversight of mission planning, range coordination, and mission requirements <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p>		67.373 -	68.111 -	64.922 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
- SEE ABOVE.				
FY 2019 Plans: - SEE ABOVE.				
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects efficiencies realized in MDA support contracting and reduced reliance on other Government agency civilian support.				
Title: Resources		57.836	56.245	51.239
Articles:		-	-	-
Description: BMDS Target Resources consist of two sub-elements: Systems Engineering/Program Management and Logistics. Systems Engineering/Program Management provides technical direction to meet Target Program requirements while balancing cost, schedule, performance, and risk. It conducts functional requirements allocation to product lines, defines product line specifications/interfaces, performs configuration and data management, and follows guidelines for design reviews. It performs target system analysis to verify system performance, defines target program baselines, controls flight test configurations, and conducts pre and post-flight analysis. It identifies treaty and environmental issues and develops plans for issue resolution. It provides Quality, Safety, and Mission Assurance operations to ensure compliance with Missile Defense Agency requirements for design, test, manufacturing, quality, safety and reliability to ensure high quality products are delivered for test events. It also includes Single Stimulation Framework (SSF)/Objective Simulation Framework (OSF) compatible Modeling and Simulation execution and improvements to evolve TC Modeling and Simulation capability; trajectory analyses; signature analyses and characterization; studies to assess alternative target and platform solutions; assessments of risk management; and design approval of government furnished equipment. Specific Systems Engineering Planned Accomplishments include: -Continue Program Management and Business Operations for target components to provide a framework for overall management of the Targets program -Continue providing classified network connections to Other Government Agencies (OGAs) so their subject matter experts can be used to support Target requirements -Continue analyses of future target Launch Vehicles, Re-Entry Vehicles, and launch platforms to ensure they are threat representative and that the Agency is making use of available technology in our future designs -Continue performing Pedigree Reviews to ensure high probability of mission success -Continue information technology and classified network support to ensure sensitive target information is not compromised -Continue Software Independent Verification and Validation (IV&V) to provide risk reduction of flight missions for target systems under development, including the Intermediate Range Ballistic Missile (IRBM) and Modified Ballistic Re-Entry Vehicle-5 (MBRV-5)				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>BMDS Targets Program Logistics support provides target storage, aging surveillance, and transportation of TC hardware in support of BMDS testing. Also included are integrated logistics support for facilities, inventory maintenance, spare parts, aging surveillance, disposal, special testing for rocket motor propellants, and other hazardous material handling. This task manages and oversees accountability of all government furnished equipment and contractor acquired property. Logistics also provides common support equipment for launch vehicles, MBRVs, countermeasures, and all up integrated target rounds. It also supports launch site activations through the transportation of support equipment to various test sites. Specific Targets Logistics Planned Accomplishments include:</p> <ul style="list-style-type: none"> -Continue Multi-Class Inventory storage, aging surveillance, maintenance of existing assets, and transportation support that ensured availability of Modified Ballistic Re-entry Vehicles and ground support equipment -Conduct disposal actions of inert assets <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects efficiencies realized from streamlining prime contractor systems engineering, program management and logistics efforts.</p>				
<p>Title: Flight Test Execution</p> <p align="right">Articles:</p> <p>Description: Flight Test Execution is performed by the Target Launch Operations group. This group conducts target mission planning, coordinates target range and mission requirements, and provides target technical information to the Missile Defense Agency's General Counsel to support treaty approvals. The Target Launch Operations Group is the primary link between the target developer and the Ballistic Missile Defense System test community, incorporating target system constraints into the BMDS mission countdown and launch constraints.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Decrease is due to fewer flight tests in the Agency's Integrated Master Test Plan for FY 2018.</p>		38.618 -	37.079 -	36.741 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>-Conduct final target integration with the test range and accomplish launch operations of an ICBM target in support of Ground-Based Midcourse Defense (GMD) Initial Operational Test and Evaluation (IOT&E) demonstrating a salvo (2) engagement firing two 3-stage C1 Heritage Ground Based Interceptors with CE-I and CE-I Exo-atmospheric Kill Vehicles (EKV)</p> <p>-Conduct final target integration with the test range and accomplish launch operations of an IRBM target in support of an Aegis BMD Baseline 9.C2 SM-3 Blk IIA Engage on Remote (AN/TPY-2 Forward Based Mode)</p> <p>-Conduct final target integration with the test range and accomplish launch operations of two IRBM targets in support of an operational engagement using European Phased Adaptive Approach (EPAA) Phase 3 architecture</p> <p>-Conduct initial planning and final target integration with the test range and forward staging area in support of Two IRBM targets and one MRBM target in support of a BMDS Integrated Operational Test engagement using regional/theater architecture</p> <p>-Conduct final target integration with the test range and accomplish launch operations of Short Range Ballistic Missile (SRBM) target in support of Aegis BMD SM-6 Dual II (simultaneous engagement with AAW)</p> <p>FY 2019 Plans:</p> <p>-Conduct final target integration with the test range and launch operations of a Medium Range Ballistic Missile target in support of Aegis BMD BL 9.C2 Software demonstrating a salvo engagement (2) firing two SM-6 Dual II</p> <p>-Conduct final target integration with the test range and Forward Staging Area to accomplish launch operations of two Intermediate Range Ballistic Missile targets and one Medium Range Ballistic Missile target in support of an operational engagement using a Regional / Theater BMDS Architecture (Aegis / THAAD / PATRIOT)</p> <p>-Conduct final target integration with the test range and launch operations of a Medium Range Ballistic Missile target in support of Aegis BMD BL 9.C2 Software demonstrating a salvo engagement (2) firing two SM-6 Dual II</p> <p>-Conduct final target integration with the test range and launch operations of two Short Range Ballistic Missile targets in support of Aegis BMD BL 9.C2 Software demonstrating a salvo engagement (2) Missile Segment Enhancement firing four SM-6 Dual II</p> <p>-Conduct final target integration with the test range and launch operations of a Medium Range Ballistic Missile target in support of Aegis BMD 4.0.3 BL 9.C1 Software demonstrating SM-SM-3 Blk 1B Launch on Remote (Reaper)</p> <p>-Conduct final target integration with the test range and Forward Staging Area to accomplish launch operations of a Medium Range Ballistic Missile target in support of Aegis BMD BL 9.C2 Software data collection</p> <p>-Conduct final target integration with the test range and Forward Staging Area to accomplish launch operations of a Medium Range Ballistic Missile target in support of Upgraded Early Warning Radar Cape Cod sensor tracking test</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>				
Accomplishments/Planned Programs Subtotals		496.730	441.657	501.037

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy

The MDA BMDS Targets Program provides for the development and purchase of ballistic missile targets and countermeasures for the BMDS in support of the MDA's flight test program. The BMDS Targets Program requirements are derived from the BMDS Integrated Master Test Plan (IMTP).

The BMDS Targets and Countermeasures Program Acquisition Strategy is based on three premises. The first is to utilize existing capabilities. The second is to initiate new development if there is no existing capability using firm-fixed price contracts with incentive fee based on cost, schedule and performance. The third premise is to use cost reimbursable contracts with incentive fee based on cost, schedule, and performance for new development that has high-risk.

MDA BMDS Targets Program competitively awarded a prime contract to Orbital Sciences Corporation air-launched IRBM targets. This award included two follow-on options; one for eight IRBM targets (exercised) and another for one to six IRBM targets.

MDA BMDS Targets Program conducted a limited competition and awarded a contract modification to Orbital Sciences Corporation for development of ICBM targets. This award included two ICBM Stage Zero Kits to be used with an existing air-launched IRBM target.

The United States Air Force transferred the L-3 Communications/Coleman Aerospace Corporation contract for one air-launched medium range ballistic missile and one air-launched short range ballistic missile to MDA in FY 2013.

MDA BMDS Targets Program competitively awarded a prime contract to L-3 Communications/Coleman Aerospace Corporation to provide 6 MRBM targets. This award includes one follow-on option, for up to twelve additional MRBM targets.

The Short Range Ballistic Missile T4 (SRBM T4) and Medium Range Ballistic Missile T4 (MRBM T4) (previously called the Aegis Readiness Assessment Vehicles (ARAVs)) target efforts are managed by MDA BMDS Targets Program and the Naval Surface Warfare Center Port Hueneme Division White Sands (NSWC PHD WS). NSWC PHD WS has unique sounding rocket expertise and access to existing contracts managed by White Sands Missile Range that makes this a beneficial relationship for both parties. MDA BMDS Targets Program provides targets funding via Military Interdepartmental Purchase Orders that NSWC PHD WS expends on its hardware development and engineering contracts.

MDA BMDS Targets Program is currently in various stages of planning or execution for procurement of ballistic missile targets by range class: SRBM, MRBM, IRBM, and ICBM. These targets will be procured using a Target Performance Specification to support flight test requirements as identified in the IMTP. Each target class will be solicited, evaluated, and competitively awarded independently in IMTP "need date" priority order.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>

<u>E. Performance Metrics</u> N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Consumables - Short Range Ballistic Missiles (SRBM) - 1	C/CPAF	L3 Communications/ Coleman Aerospace : Orlando, FL	30.257	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 10	C/CPAF	Northrop Grumman Space and Mission Systems, Corporation : Huntsville, AL	0.000	4.031	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 2	MIPR	Naval Surface Warfare Center, Port Hueneme : Port Hueneme, CA	56.099	11.899	Nov 2016	5.316	Nov 2017	7.682	Nov 2018	-		7.682	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 6	C/CPAF	Juno Target : TBD	2.750	0.000		0.000		0.000		-		0.000	0.000	2.750	0.000
Consumables - Short Range Ballistic Missiles (SRBM) - 7	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	20.965	0.000		1.014	Nov 2017	0.000		-		0.000	0.000	21.979	20.965
Consumables - Short Range Ballistic Missiles (SRBM) - 8	C/CPAF	Future Low Cost Target : TBD	0.000	0.000		2.838	Mar 2018	21.760	Mar 2019	-		21.760	0.000	24.598	4.192
Consumables - Short Range Ballistic Missiles (SRBM) - 9	FFRDC	Johns Hopkins University Applied Physics Laboratory : Laurel, MD	0.000	7.026	Dec 2016	0.000		0.390	Dec 2018	-		0.390	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 1	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	417.747	33.355	Nov 2016	22.879	Nov 2017	0.893	Nov 2018	-		0.893	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 10	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	0.000	38.497	Feb 2017	22.517	Nov 2017	38.096	Nov 2018	-		38.096	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Consumables - Medium Range Ballistic Missiles (MRBM) - 11	MIPR	Naval Surface Warfare Center : Crane, IN	0.000	0.000		0.278	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 12	C/CPAF	Future MRBM Countermeasures : TBD	0.000	0.000		11.099	Jun 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 13	C/CPAF	Future MRBM RFP : TBD	0.000	0.000		10.367	Jun 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 14	C/CPAF	Future MRBM RV RFP : TBD	0.000	0.000		13.300	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 15	FFRDC	Applied Physics Lab/Johns Hopkins University : Laurel, MD	0.000	0.000		0.000		4.658	Dec 2018	-		4.658	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 16	MIPR	Naval Surface Warfare Center : Port Hueneme, CA	0.000	0.000		0.000		5.495	Nov 2018	-		5.495	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 17	MIPR	Space and Missile Systems Center : Albuquerque, NM	0.000	0.000		0.000		5.750	Nov 2018	-		5.750	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 18	MIPR	Yuma Proving Grounds : Yuma, AZ	0.000	0.000		0.000		0.070	Nov 2018	-		0.070	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 2	C/CPAF	L3 Communications/ Coleman Aerospace : Orlando, FL	177.137	58.321	Nov 2016	19.397	Nov 2017	39.939	Nov 2018	-		39.939	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 3	MIPR	Naval Surface Warfare Center, Dahlgren Division : Dahlgren, VA	0.481	0.058	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
0400 / 4				PE 0603915C / Ballistic Missile Defense Targets				MT05 / BMDS Targets Program							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Consumables - Medium Range Ballistic Missiles (MRBM) - 5	MIPR	White Sands Missile Range : White Sands, NM	0.396	0.184	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 6	MIPR	Pacific Missile Range Facility : Barking Sands, HI	0.217	0.101	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 7	MIPR	Space and Missile Defense Command : Huntsville, AL	1.818	0.000		0.115	Dec 2017	0.000		-		0.000	0.000	1.933	0.000
Consumables - Medium Range Ballistic Missiles (MRBM) - 8	C/CPAF	Future Subscale MRBM RFP : TBD	0.000	0.000		0.000		12.911	Mar 2019	-		12.911	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 9	MIPR	Defense Information Systems Agency : Fort Meade, MD	0.000	0.031	Nov 2016	0.000		0.076	Nov 2018	-		0.076	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 1	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	423.994	88.101	Nov 2016	44.884	Nov 2017	96.797	Nov 2018	-		96.797	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 10	C/CPFF	Orbital/Alliant Techsystems : Magna, UT	0.000	0.000		3.842	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 11	MIPR	Defense Finance and Accounting Services : Indianapolis, IN	0.000	0.000		0.341	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 12	MIPR	Naval Air Weapons Station : China Lake, CA	0.000	0.000		0.759	Dec 2017	0.082	Nov 2018	-		0.082	Continuing	Continuing	Continuing
Consumables - Intermediate Range	MIPR	Redstone Garrison : Huntsville, AL	0.000	0.000		0.040	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMD5 Targets Program</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Ballistic Missiles (IRBM) - 13															
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 14	MIPR	Air Force Research Laboratory : Wright Patterson AFB, OH	0.000	0.000		0.055	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 15	FFRDC	Sandia National Laboratories : Albuquerque, NM	0.000	1.786	Dec 2016	0.000		13.674	Dec 2018	-		13.674	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 16	FFRDC	Georgia Tech Research Institute : Atlanta, GA	0.000	1.923	Dec 2016	0.000		9.933	Dec 2018	-		9.933	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 17	MIPR	Naval Surface Warfare Center : Dahlgren, VA	0.000	0.000		0.000		0.026	Nov 2018	-		0.026	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 4	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	27.417	29.723	Nov 2016	1.951	Nov 2017	3.834	Nov 2018	-		3.834	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 5	C/CPAF	Lockheed Martin Space Systems Company : United Kingdom	0.000	0.417	Nov 2016	0.882	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 6	C/CPAF	Countermeasures RFP : TBD	0.000	0.000		8.108	Jun 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 7	C/CPAF	MBRV-8 Characterization RFP : TBD	0.000	0.000		9.018	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 8	MIPR	US Army Garrison - Natick : Natick, MA	0.000	0.036	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 9	C/CPAF	Future MBRV RFP : TBD	0.000	0.000		4.779	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 1	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	163.712	22.823	Nov 2016	55.502	Nov 2017	85.960	Nov 2018	-		85.960	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 10	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	0.000	10.848	Nov 2016	4.306	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 11	FFRDC	Massachusetts Institute of Technology, Lincoln Labs : Lexington, MA	0.000	10.172	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 12	C/CPAF	MBRV-X RFP : TBD	0.000	9.690	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 13	C/CPAF	Lockheed Martin Space Systems Company : United Kingdom	0.000	0.000		3.363	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 14	MIPR	Air Force Research Laboratory : Wright Patterson AFB, OH	0.000	0.000		0.055	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 15	C/CPAF	ICBM T3C2 RFP : TBD	0.000	0.000		14.223	Jun 2018	0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
0400 / 4				PE 0603915C / Ballistic Missile Defense Targets				MT05 / BMDS Targets Program							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Consumables - Intercontinental Ballistic Missiles (ICBM) - 16	C/CPAF	Future MBRV RFP : TBD	0.000	0.000		9.018	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 2	C/CPFF	Alliant Techsystems : Magna, UT	7.459	3.801	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 3	MIPR	Defense Financial and Accounting Service : Indianapolis, IN	2.656	0.000		0.000		0.000		-		0.000	0.000	2.656	0.000
Consumables - Intercontinental Ballistic Missiles (ICBM) - 4	MIPR	Naval Air Weapons Station : China Lake, CA	0.525	0.080	Nov 2016	0.000		0.083	Nov 2018	-		0.083	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 5	MIPR	Naval Surface Warfare Center, Dahlgren Division : Dahlgren, VA	0.071	0.000		0.076	Dec 2017	0.026	Dec 2018	-		0.026	0.000	0.173	0.000
Consumables - Intercontinental Ballistic Missiles (ICBM) - 6	MIPR	Pacific Missile Range Facility : Barking Sands, HI	0.107	0.000		0.000		0.000		-		0.000	0.000	0.107	0.000
Consumables - Intercontinental Ballistic Missiles (ICBM) - 7	MIPR	Redstone Garrison : Huntsville, AL	0.040	0.000		0.000		0.000		-		0.000	0.000	0.040	0.000
Consumables - Intercontinental Ballistic Missiles (ICBM) - 8	MIPR	Reagan Test Site : Kwajalein Atoll	2.836	0.000		0.000		0.000		-		0.000	0.000	2.836	0.000
Consumables - Joint Emergent Operational Need Statement (JEON) - 1	C/CPAF	L3 Communications/ Coleman Aerospace : Orlando, FL	0.000	0.000		9.900	Dec 2017	0.000		-		0.000	0.000	9.900	0.000
Program Planning & Operations - Program Planning and Operations - 1	C/CPAF	Targets TEAMS Support : Huntsville, AL	152.127	34.579	Nov 2016	35.948	Nov 2017	35.117	Nov 2018	-		35.117	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
0400 / 4				PE 0603915C / Ballistic Missile Defense Targets				MT05 / BMDS Targets Program							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Planning & Operations - Program Planning and Operations - 10	MIPR	Missile Defense Agency : Huntsville, AL	114.778	28.688	Oct 2016	29.992	Oct 2017	27.601	Nov 2018	-		27.601	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 12	C/FFP	Network Management Resources : Chantilly, VA	1.983	0.866	Nov 2016	0.133	Nov 2017	0.137	Nov 2018	-		0.137	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 13	MIPR	Naval Surface Warfare Center : Crane, IN	0.000	0.000		0.273	Nov 2017	0.302	Nov 2018	-		0.302	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 14	FFRDC	Mitre Corporation : Huntsville, AL	0.000	0.000		0.000		0.320	Dec 2018	-		0.320	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 6	FFRDC	Johns Hopkins University, Applied Physics Lab : Baltimore, MD	2.359	0.586	Nov 2016	1.118	Dec 2017	1.022	Dec 2018	-		1.022	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 7	MIPR	US Army Aviation & Missile Command : Huntsville, AL	5.275	0.000		0.406	Nov 2017	0.423	Nov 2018	-		0.423	0.000	6.104	0.000
Program Planning & Operations - Program Planning and Operations - 8	MIPR	Aviation & Missile Research, Dev & Eng Center : Huntsville, AL	6.289	0.000		0.000		0.000		-		0.000	0.000	6.289	0.000
Program Planning & Operations - Program Planning and Operations - 9	MIPR	US Air Force Space & Missile Systems Center (SMC) : Albuquerque, NM	3.593	2.654	Nov 2016	0.241	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 37	FFRDC	Aerospace Corporation : El Segundo, CA	0.000	0.000		1.967	Nov 2017	3.525	Nov 2018	-		3.525	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
0400 / 4				PE 0603915C / Ballistic Missile Defense Targets				MT05 / BMDS Targets Program							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Resources - Resources/ Logistics - 38	MIPR	Redstone Test Center : Huntsville, AL	0.000	0.000		0.510	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 39	MIPR	Defense Information Systems Agency : Fort Meade, MD	0.000	0.000		0.082	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 40	MIPR	Army Information Management Command : San Antonio, TX	0.000	0.000		0.620	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 41	MIPR	Marshall Space Flight Center : Huntsville, AL	0.000	0.000		0.010	Dec 2017	0.011	Dec 2018	-		0.011	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 42	MIPR	Dugway Proving Ground : Dugway, UT	0.000	0.000		0.004	Dec 2017	0.012	Dec 2018	-		0.012	Continuing	Continuing	Continuing
Resources - Resources - TBD	TBD	Future ILS/Systems Engineering Support : TBD	0.000	0.000		0.000		25.374	Dec 2018	-		25.374	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 1	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	36.281	7.861	Nov 2016	6.774	Nov 2017	0.266	Nov 2018	-		0.266	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 11	MIPR	Naval Surface Warfare Center : Crane, IN	3.806	0.000		0.040	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 12	MIPR	Redstone Arsenal Garrison : Huntsville, AL	3.221	0.040	Nov 2016	0.011	Nov 2017	0.012	Nov 2018	-		0.012	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 16	MIPR	US Property & Fiscal Office for Arizona : Phoenix, AZ	6.994	0.000		1.963	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 17	MIPR	US Army White Sands Missile	0.538	0.518	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		Range : White Sands, NM													
Resources - Resources/ Logistics - 18	MIPR	Defense Finance & Accounting Service : Indianapolis, IN	2.727	0.323	Nov 2016	0.641	Nov 2017	0.144	Nov 2018	-		0.144	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 2	C/CPFF	Orbital/Alliant Techsystems : Magna, UT	0.790	0.255	Nov 2016	0.982	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 21	MIPR	US Air Force Space & Missile Systems Center (SMC) : Albuquerque, NM	17.790	3.813	Nov 2016	2.474	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 23	C/FFP	Venturi Aerospace : Huntsville, AL	2.115	0.026	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 24	C/FFP	TASC, Inc. : Albuquerque, NM	7.167	0.767	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 25	MIPR	Tooele Army Depot : Tooele, UT	1.122	0.049	Nov 2016	0.446	Dec 2017	0.487	Dec 2018	-		0.487	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 3	C/FFP	Aerojet Corporation : Albuquerque, NM	0.843	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 34	C/CPFF	Inuteq, Corp. : Beltsville, MD	1.521	0.755	Nov 2016	0.791	Nov 2017	0.809	Nov 2018	-		0.809	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 35	MIPR	Space and Naval Warfare Systems Command : San Diego, CA	0.000	0.022	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 36	MIPR	Tobyhanna Army Depot : Tobyhanna, PA	0.000	1.089	Nov 2016	1.101	Nov 2017	0.984	Nov 2018	-		0.984	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 43	MIPR	Army Installation Management Command : San Antonio, TX	0.000	0.000		0.000		0.674	Nov 2018	-		0.674	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Resources - Resources/ Logistics - 5	MIPR	Aviation & Missile Research, Dev & Eng Center : Huntsville, AL	8.899	0.284	Nov 2016	0.268	Nov 2017	0.274	Nov 2018	-		0.274	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 6	MIPR	Hill Air Force Base : Ogden, UT	3.948	2.030	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 7	MIPR	Missile Defense Agency : Huntsville, AL	7.841	0.197	Oct 2016	0.119	Nov 2017	0.148	Nov 2018	-		0.148	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 1	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	87.896	17.392	Nov 2016	13.828	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 10	FFRDC	Sandia National Laboratories : Albuquerque, NM	4.369	0.549	Dec 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 14	MIPR	Naval Air Warfare Center : Point Mugu, CA	4.036	1.913	Nov 2016	0.986	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 15	MIPR	Missile Defense Agency : Huntsville, AL	0.000	1.715	Oct 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 16	TBD	L167 Support : TBD	0.000	0.000		10.263	Mar 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 17	MIPR	Defense Finance & Accounting Service : Indianapolis, IN	0.000	0.000		0.000		0.336	Nov 2018	-		0.336	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 18	MIPR	Redstone Arsenal Garrison : Huntsville, AL	0.000	0.000		0.000		0.033	Nov 2018	-		0.033	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 2	FFRDC	Aerospace Corporation : El Segundo, CA	14.096	2.632	Nov 2016	3.382	Dec 2017	4.376	Dec 2018	-		4.376	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Resources - Resources/ Systems Engineering - 6	FFRDC	Johns Hopkins University, Applied Physics Lab : Baltimore, MD	2.715	0.798	Nov 2016	0.000		0.919	Nov 2018	-		0.919	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 7	MIPR	US Air Force Space & Missile Systems Center (SMC) : Albuquerque, NM	9.178	4.871	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 8	MIPR	Aviation & Missile Research, Dev & Eng Center : Huntsville, AL	44.265	9.937	Nov 2016	8.983	Nov 2017	12.855	Nov 2018	-		12.855	Continuing	Continuing	Continuing
Flight Test Execution - 1	MIPR	Missile Defense Agency : Huntsville, AL	0.382	0.374	Oct 2016	0.319	Oct 2017	3.196	Oct 2018	-		3.196	Continuing	Continuing	Continuing
Flight Test Execution - 10	MIPR	Hickam Field : Pearl Harbor, HI	0.205	0.184	Nov 2016	0.097	Dec 2017	0.017	Dec 2018	-		0.017	Continuing	Continuing	Continuing
Flight Test Execution - 11	MIPR	Redstone Army Airfield : Redstone Arsenal, AL	0.019	0.019	Nov 2016	0.224	Dec 2017	0.057	Dec 2018	-		0.057	Continuing	Continuing	Continuing
Flight Test Execution - 12	MIPR	Redstone Test Center : Huntsville, AL	0.115	0.111	Nov 2016	0.048	Nov 2017	0.008	Nov 2018	-		0.008	Continuing	Continuing	Continuing
Flight Test Execution - 13	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	1.488	2.072	Nov 2016	1.921	Nov 2017	3.022	Nov 2018	-		3.022	Continuing	Continuing	Continuing
Flight Test Execution - 14	MIPR	Naval Air Warfare Center : Pt. Mugu, CA	0.429	0.436	Nov 2016	3.435	Dec 2017	1.153	Dec 2018	-		1.153	Continuing	Continuing	Continuing
Flight Test Execution - 15	C/CPAF	Lockheed Martin Space Systems Company : Courtland, AL	0.000	0.000		0.019	Dec 2017	0.129	Dec 2018	-		0.129	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
0400 / 4				PE 0603915C / Ballistic Missile Defense Targets				MT05 / BMDS Targets Program							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - 16	MIPR	Charleston Air Force Base : Charleston, SC	0.000	0.000		0.022	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 17	MIPR	Columbus Air Force Base : Columbus, MS	0.000	0.000		0.022	Dec 2017	0.023	Dec 2018	-		0.023	Continuing	Continuing	Continuing
Flight Test Execution - 18	MIPR	Naval Surface Warfare Center : Dahlgren, VA	0.000	0.000		0.241	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 19	MIPR	National Security Agency : Fort Meade, MD	0.000	0.000		0.066	Dec 2017	0.068	Dec 2018	-		0.068	Continuing	Continuing	Continuing
Flight Test Execution - 2	MIPR	Defense Finance and Accounting Services : Indianapolis, IN	6.388	9.052	Nov 2016	11.323	Oct 2017	8.220	Oct 2018	-		8.220	Continuing	Continuing	Continuing
Flight Test Execution - 20	MIPR	Naval Surface Warfare Center : Port Hueneme, CA	0.000	0.000		0.000		6.912	Dec 2018	-		6.912	Continuing	Continuing	Continuing
Flight Test Execution - 3	MIPR	Pacific Missile Range Facility : Barking Sands, HI	6.281	11.607	Nov 2016	1.820	Nov 2017	3.477	Nov 2018	-		3.477	Continuing	Continuing	Continuing
Flight Test Execution - 4	MIPR	Reagan Test Site : Kwajalein Atoll	3.124	6.031	Nov 2016	4.294	Nov 2017	3.237	Nov 2018	-		3.237	Continuing	Continuing	Continuing
Flight Test Execution - 5	MIPR	Edwards Air Force Base : Lancaster, CA	2.332	6.102	Nov 2016	9.198	Dec 2017	4.608	Nov 2018	-		4.608	Continuing	Continuing	Continuing
Flight Test Execution - 6	MIPR	US Army Yuma Proving Ground : Yuma, AZ	0.285	0.298	Nov 2016	1.730	Nov 2017	0.417	Nov 2018	-		0.417	Continuing	Continuing	Continuing
Flight Test Execution - 7	MIPR	Eglin Air Force Base : Eglin AFB, FL	0.137	0.167	Nov 2016	0.275	Nov 2017	0.130	Nov 2018	-		0.130	Continuing	Continuing	Continuing
Flight Test Execution - 8	C/CPAF	L3 Communications/ Coleman	0.727	1.666	Nov 2016	0.676	Nov 2017	1.385	Nov 2018	-		1.385	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
		Aerospace : Orlando, FL													
Flight Test Execution - 9	MIPR	Air Force Research Laboratory : Wright Patterson AFB, OH	0.475	0.499	Nov 2016	1.349	Dec 2017	0.682	Dec 2018	-		0.682	Continuing	Continuing	Continuing
Subtotal			1,917.633	496.730		441.657		501.037		-		501.037	Continuing	Continuing	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,917.633	496.730	441.657	501.037	-	501.037	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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	Significant Event Complete ▲		Milestone Decision Complete ★		Element Test Complete ◆		System Level Test Complete ●		Complete Activity ◆													
	Significant Event Planned △		Milestone Decision Planned ☆		Element Test Planned ◇		System Level Test Planned ○		Planned Activity ◇													
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023			
SRBM T4-E Pre-Ship Readiness Review (Ship Set 4)	▲																					
SRBM T4-E Pre-Ship Readiness Review (Ship Set 3)	▲																					
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 2)			▲																			
MRBM Type 3 Pre-Ship Readiness Review (Ship Set 2)				▲																		
ELRALT Pre-Ship Readiness Review (Ship Set 2)				▲																		
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)					△																	
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 6)						△																
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 7)						△																
ICBM Pre-Ship Readiness Review (Ship Set 2)							△															
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 5)								△														
SRBM T4-G Pre-Ship Readiness Review (Ship Set 1)									△													
SRBM T4-G Pre-Ship Readiness Review (Ship Set 2)										△												
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 6)											△											
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 1)												△										
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 8)													△									
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 9)														△								
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 25)															△							
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 10)																△						
ICBM Pre-Ship Readiness Review (Ship Set 3)																	△					
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 26)																		△				
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 11)																			△			
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 6)																				△		
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 7)																					△	
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 5)																						△

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023			
	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 12)															△							
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 7)															△							
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 8)															△							
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 13)																△						
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)																	△					
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 2)																		△				
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 14)																			△			
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 1)																				△		
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 2)																					△	
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 3)																						△
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 15)																						△
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)																						△
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 3)																						△
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)																						△
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 16)																						△
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 17)																						△
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 18)																						△

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
SRBM T4-E Pre-Ship Readiness Review (Ship Set 4)	1	2017	1	2017
SRBM T4-E Pre-Ship Readiness Review (Ship Set 3)	1	2017	1	2017
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 2)	3	2017	3	2017
MRBM Type 3 Pre-Ship Readiness Review (Ship Set 2)	4	2017	4	2017
ELRALT Pre-Ship Readiness Review (Ship Set 2)	4	2017	4	2017
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)	1	2018	1	2018
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 6)	2	2018	2	2018
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 7)	2	2018	2	2018
ICBM Pre-Ship Readiness Review (Ship Set 2)	3	2018	3	2018
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 5)	4	2018	4	2018
SRBM T4-G Pre-Ship Readiness Review (Ship Set 1)	2	2019	2	2019
SRBM T4-G Pre-Ship Readiness Review (Ship Set 2)	2	2019	2	2019
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 6)	2	2019	2	2019
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 1)	3	2019	3	2019
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 8)	3	2019	3	2019
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 9)	3	2019	3	2019
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 25)	3	2019	3	2019
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 10)	4	2019	4	2019
ICBM Pre-Ship Readiness Review (Ship Set 3)	1	2020	1	2020
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 26)	3	2020	3	2020
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 11)	4	2020	4	2020
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 6)	1	2021	1	2021

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MT05 / <i>BMDS Targets Program</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 7)	1	2021	1	2021
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 5)	1	2021	1	2021
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 12)	2	2021	2	2021
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 7)	2	2021	2	2021
MRBM Type 4-E Pre-Ship Readiness Review (Ship Set 8)	2	2021	2	2021
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 13)	3	2021	3	2021
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)	4	2021	4	2021
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 2)	2	2022	2	2022
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 14)	2	2022	2	2022
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 1)	2	2022	2	2022
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 2)	2	2022	2	2022
SRBM Type 4-B Pre-Ship Readiness Review (Ship Set 3)	2	2022	2	2022
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 15)	4	2022	4	2022
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)	4	2022	4	2022
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 3)	2	2023	2	2023
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)	3	2023	3	2023
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 16)	3	2023	3	2023
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 17)	3	2023	3	2023
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 18)	3	2023	3	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program Wide Support</i>	75.383	24.938	18.217	16.464	-	16.464	17.604	17.304	18.927	18.942	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) reflects proportional changes as a result of budget changes to the Ballistic Missile Defense Targets program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	24.938	18.217	16.464
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	24.938	18.217	16.464

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy N/A		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)					
0400 / 4					PE 0603915C / Ballistic Missile Defense Targets					MD40 / Program Wide Support					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various Multi : AL, CO, CA, VA etc.	20.377	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Facilities and Maintenance (Reqn)	Reqn	Various Multi : AL, CO, CA, VA etc.	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Infrastructure Support (MIPR)	MIPR	Various; Multi : AL, VA	27.237	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Infrastructure Support (FFP)	C/FFP	Northrop Grumman; Multi : AL, VA	9.460	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various; Multi : AL, CA, CO, VA	5.151	1.232	Jul 2017	0.364	Jul 2018	0.249	Jul 2019	-		0.249	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (FFP)	C/FFP	Mantech Security Mission Assurance Corporation : Multi: AL, CO, CA, VA	0.000	0.000		0.000		2.422	Apr 2019	-		2.422	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi:AL, CA, CO, VA	5.560	6.645	Aug 2017	10.591	Aug 2018	11.000	Apr 2019	-		11.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	MIPR	Various Multi : AK, AL, CA, CO, HI, VA	0.623	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations, Sustainment and GPC	Allot	Various, Multi : AL, CO, CA, VA etc	3.199	1.875	Sep 2017	1.500	Sep 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance SRM	MIPR	Various : Multi: AK, AL, CA, VA	3.776	15.186	Jan 2017	5.762	Jan 2018	2.793	May 2019	-		2.793	Continuing	Continuing	Continuing
Subtotal			75.383	24.938		18.217		16.464		-		16.464	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	75.383	24.938	18.217	16.464	-	16.464	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆													
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇													
				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023	
MD40 Program-Wide Support				◇◇◇◇◇		◇◇◇◇◇		◇◇◇◇◇		◇◇◇◇◇		◇◇◇◇◇		◇◇◇◇◇		◇◇◇◇◇	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	24.743	84.514	128.406	148.822	-	148.822	172.423	143.240	143.938	174.770	Continuing	Continuing
MD98: <i>Directed Energy Demonstrator Development</i>	-	14.265	48.099	61.317	-	61.317	66.266	60.697	70.704	72.040	Continuing	Continuing
MD99: <i>Discrimination Sensor Demonstrator Development</i>	18.362	56.988	73.295	78.608	-	78.608	94.217	74.068	66.263	94.528	Continuing	Continuing
MT99: <i>Technology Maturation Initiatives Test</i>	2.070	8.434	0.220	1.982	-	1.982	4.285	1.839	0.000	0.000	0.000	18.830
MC98: <i>Cyber Operations</i>	0.140	0.331	0.172	0.254	-	0.254	0.177	0.180	0.270	0.275	Continuing	Continuing
MD40: <i>Program Wide Support</i>	4.171	4.496	6.620	6.661	-	6.661	7.478	6.456	6.701	7.927	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

Technology Maturation Initiative (TMI) develops technology that is matured beyond the laboratory. TMI focuses on improved accuracy, adding range, and conducting operationally representative airborne sensor tests using MDA Configured MQ-9 Remotely Piloted Aircraft (RPA), equipped with advanced sensors (tracking lasers, advanced detectors, infrared sensors, and precision tracking and discrimination algorithms). It incorporates industry technology breakthroughs to develop and demonstrate low to mid power lasers on a high altitude airborne platform. Together, these advanced components and tests address complex tracking, discrimination, and boost phase kill challenges for the Ballistic Missile Defense System (BMDS) in support of the Strategic Commands Prioritized Capabilities List and address evolving threats to the homeland from the Pacific theater.

MDA will develop cost effective technology demonstrators to address specific risks:

- A high altitude low power laser equipped airborne system to demonstrate finding, tracking and engaging boosting missiles at the standoff ranges required for missile defense
- An advanced sensor integrated into a MDA Configured MQ-9 to provide discrimination of lethal objects
- An advanced sensor space payload that builds on the airborne discrimination program to demonstrate persistent overhead discrimination coverage
- Continuation of testing of the passive MDA Configured MQ-9 system to validate performance against emerging advanced threats

The Low Power Laser Demonstrator (LPLD) program integrates a tracking laser with a more powerful mission laser and larger beam control system on a high altitude airborne platform. This airborne demonstrator addresses a broad spectrum of directed energy mission applications while refining a missile defense concept of operations

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>
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doctrine for incorporating lasers into the BMDS. MDA's directed energy plan incrementally demonstrates and improves the constituent components required to execute a directed energy kill chain; acquisition, tracking and lethality. The Agency will select from industry concepts to integrate and test a low to mid power laser on a high altitude airborne platform. The LPLD shapes future BMDS acquisition choice by advancing and citing the technology readiness levels of emerging and developing technology, while simultaneously assessing the performance and contributions to the BMDS architecture.

The MDA Configured MQ-9 provides a low cost, mid-altitude unmanned test platform capable of carrying small laser and advanced sensor payloads. This platform allows MDA to introduce unmanned systems and tracking lasers into the BMDS, develop the associated concept of operations and provide the basis for a quick reaction precision tracking capability to augment radar. The advanced sensor incorporates incrementally developed, integrated, and tested next-generation sensors and detectors to demonstrate Launch-on-Remote, Engage-on-Remote, discrimination and handover improvements for missile defense first from the air and then from space. These advanced sensors improve the probability of engagement success for stressing threats, expand the BMD battle space and increase the ability to negate larger raid sizes.

To address emerging advanced threats, MDA may use MDA-configured MQ-9s to support hypersonic threat testing scenarios.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	99.366	128.406	168.388	-	168.388
Current President's Budget	84.514	128.406	148.822	-	148.822
Total Adjustments	-14.852	0.000	-19.566	-	-19.566
• Congressional General Reductions	-3.874	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.878	0.000			
• FY 2017 Request for Additional Appropriations	-9.100	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-19.566	-	-19.566

Change Summary Explanation

Reduction to Directed Energy efforts in FY 2019 from PB18 to PB19 reflects a realignment of funds to continue focus on increasing BMD system reliability to build Warfighter confidence.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD98 / <i>Directed Energy Demonstrator Development</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
	<i>MD98: Directed Energy Demonstrator Development</i>	-	14.265	48.099	61.317	-	61.317	66.266	60.697	70.704	72.040	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The Directed Energy Demonstrator Development project develops, integrates, and tests the technologies required to demonstrate the complete acquisition, tracking and lethality engagement sequence of a high energy laser system for boost-phase missile defense. The LPLD focuses on integrating the lasers, detectors, beam control system, processors, power supplies and thermal management systems into a high altitude airborne platform for missile defense laser applications. MDA will test the laser platform under realistic conditions in conjunction with on-going BMDS tests.

This approach informs a missile defense laser concept of operations under realistic BMDS scenarios. The Directed Energy Demonstrator Development project provides the necessary technology, test data, and operations familiarity to successfully transition to a higher power directed energy weapon capable of destroying a boosting missile before payloads deploy, complicating kill.

The technology, individually and jointly developed and tested by MDA, the Air Force and the Defense Advanced Research Projects Agency under the Weapons Technology program element, underpins multiple LPLD industry concepts. This LPLD provides additional collaborative development and test opportunities to investigate laser beam pointing, stability and jitter effects under various altitude and flight conditions.

This project also continues investments started under the Weapons Technology PE to demonstrate 30 kilowatt-class high efficiency; compact, electric laser scaling, to include Diode Pump Alkali Laser and Fiber Combining Laser technology, required to inform future high power laser systems.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Directed Energy Demonstrator Development	14.265	48.099	61.317
Articles:	-	-	-
Description: The Directed Energy Demonstrator Development project designs, integrates, and tests a Low Power Laser Demonstrator (LPLD) for missile defense. Depending on the specific industry initial design selected to continue through critical design, the demonstrator will consist of a kilowatt (kW)-class tracking laser, a multi-kilowatt class mission laser and a 0.5 meter telescope. A key risk area to cost effective boost phase kill is acquisition, tracking and beam stability at long stand-off ranges.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD98 / <i>Directed Energy Demonstrator Development</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>The demonstrator will incrementally verify acquisition and tracking, laser pointing and stability accuracy at extended ranges, then mission laser effectiveness at shorter ranges.</p> <p>The LPLD provides an autonomously controlled laser-equipped airborne platform to develop a missile defense directed energy Concept of Operations (CONOPS). The laser flight system, beam control methodology and laser CONOPS inform development of higher power, higher altitude directed energy systems necessary for missile defense.</p> <p>This project also develops laser technology with demonstrated abilities to scale to the high power levels required for missile defense.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <p>The increase from FY 2017 to FY 2018 funds the ramp up in Industry personnel required to transition from the initial design phase to full demonstrator development and purchase of long lead hardware required to build and test a LPLD based on the cost and schedule provided during industry's concept definition studies.</p> <p>Complete the systems engineering and preliminary design for the LPLD that integrates the lasers, detectors, beam control system, processors, power supplies and thermal management systems into an airborne platform for missile defense.</p> <ul style="list-style-type: none"> - Complete the initial design through Preliminary Design Review (PDR) -- Complete LPLD requirements flow down and engineering analysis -- Define long lead procurement requirements -- Conduct PDR - Select the best laser/aircraft design to demonstrate pointing and tracking, beam control and lethality. - Award a follow-on contract for continued development through a tailored Critical Design Review (CDR) and begin long lead material procurement -- Complete long lead build to drawings and release for fabrication -- Refine the directed energy concept of operations for laser equipped high altitude airborne platforms <p>FY 2019 Plans:</p> <p>Begin the comprehensive LPLD design work, taking a single contractor from an FY 2018 initial design, to an FY 2019 end-to-end system level blueprint for construction. This includes funding for manufacturing long-lead items, sub component procurement, integration and testing, as well as software development efforts.</p> <ul style="list-style-type: none"> - Complete the design through a tailored Critical Design Review (CDR) -- Complete final engineering analysis 				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD98 / <i>Directed Energy Demonstrator Development</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
-- Complete test planning requirements -- Complete beam control, laser, and platform interface drawings -- Conduct CDR - Procure long lead hardware and begin fabrication Incrementally develop scalable, efficient, and compact high-energy laser components for integration into high power systems. -- Demonstrate robust high power diodes - Complete Lawrence Livermore National Laboratory demonstration of a next generation diode pumped alkali laser architecture. -- Complete MIT Lincoln Laboratory Fiber Combining Laser architecture low Size, Weight and Power (SWaP) diode pump assembly <i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> The increase from FY 2018 to FY 2019 reflects the additional technical and engineering support required to progress from PDR to CDR and procure long lead materials for LPLD.			
Accomplishments/Planned Programs Subtotals	14.265	48.099	61.317

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603176C: <i>Advanced Concepts and Performance Assessment</i>	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
• 0603178C: <i>Weapons Technology</i>	47.403	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603180C: <i>Advanced Research</i>	27.185	20.184	20.365	-	20.365	20.778	21.194	21.652	22.036	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy for MD98, Directed Energy Development, consists of contracts to industry via the Advanced Technology Innovation Broad Agency Announcement and competitive procurement(s) and agreements with Federally Funded Research and Development Centers to develop and demonstrate a LPLD system in realistic test environments. MDA will leverage agency partner subject matter experts and use government model based assessments for Better Buying Power 3.0 philosophy acquisition decisions.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD98 / <i>Directed Energy Demonstrator Development</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - High Bandwidth Communications	MIPR	SAF/FMBIB Air Force : Washington DC	0.000	3.500	Jun 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - LPLD Design and Fab	C/CPFF	TBD : TBD	0.000	0.000		16.175	May 2018	49.407	Oct 2018	-		49.407	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - LPLD Preliminary Design A	C/CPFF	Lockheed Martin : CA	0.000	3.588	Jul 2017	9.000	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - LPLD Technology Transfer/Laser Scaling	MIPR	MIT LL, LLNL : MA, CA	0.000	4.212	Sep 2017	0.000		4.750		-		4.750	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - LPLD-Preliminary Design B	C/CPFF	General Atomics : CA	0.000	1.000	Jul 2017	9.000	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator	C/CPFF	Boeing : CA	0.000	0.000		9.000	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD98 / <i>Directed Energy Demonstrator Development</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development - LPLD-Preliminary Design C															
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - Laser Lethality Demonstration	MIPR	WSMR, Lockheed Martin, RTC : NM, AL	0.000	0.370	Feb 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.000	12.670		43.175		54.157		-		54.157	Continuing	Continuing	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - Advisory and Assistance Services	C/CPFF	MDA Multi : AL, NM	0.000	0.000		0.000		1.343	Oct 2018	-		1.343	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - Civilian Salaries and Travel	Allot	MDA Multi : AL, NM	0.000	0.000		0.219	Oct 2017	0.224	Oct 2018	-		0.224	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - FFRDC	MIPR	Aerospace : AL	0.000	0.395		0.000		1.497	Oct 2018	-		1.497	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD98 / <i>Directed Energy Demonstrator Development</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - Facility Support	MIPR	377th ABW : NM	0.000	0.000		0.000		0.134	Nov 2018	-		0.134	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - Facility Sustainment	C/CPFF	MDA Multi : AL, NM	0.000	0.000		0.000		0.193	Jun 2019	-		0.193	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - Information Technology	C/CPFF	Northrup Grumman : CO	0.000	0.000		0.000		0.359	Nov 2018	-		0.359	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - LPLD-Performance Analysis	MIPR	MIT LL, Aviation and Missile Research Development and Engineering Center (AMRDEC) : MA, AL	0.000	0.250	Jan 2017	2.556	Jan 2018	3.410	Oct 2018	-		3.410	Continuing	Continuing	Continuing
Directed Energy Demonstrator Development - Directed Energy Demonstrator Development - LPLD-Engineering and Technical Services	MIPR	Aviation and Missile Research Development and Engineering Center (AMRDEC) : AL	0.000	0.950	Oct 2016	2.149	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.000	1.595		4.924		7.160		-		7.160	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency								Date: February 2018					
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>				Project (Number/Name) MD98 / <i>Directed Energy Demonstrator Development</i>					
	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	14.265		48.099		61.317		-		61.317	Continuing	Continuing	N/A

Remarks

N/A

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD98 / <i>Directed Energy Demonstrator Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
LPLD Contract Awards	4	2017	4	2017
LPLD tailored PDR	3	2018	3	2018
LPLD tailored CDR	4	2019	4	2019
Laser Scaling Demonstration	4	2019	4	2019
LPLD Flight Laser Complete	3	2021	3	2021
LPLD Checkout Ground Test	1	2022	1	2022
LPLD Checkout Flight Test	3	2022	3	2022
Target Acquisition and Tracking Demonstration	4	2022	4	2022
Laser Concept of Operations	4	2022	4	2022
Beam Control and Stability Demonstration FEV-03	1	2023	1	2023
Beam Control and Stability Demonstration FEV-04	2	2023	2	2023
Beam Control and Stability Demonstration FEV-05	3	2023	3	2023
High Power Laser Demonstrator Contract Award	3	2023	3	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>				Project (Number/Name) MD99 / <i>Discrimination Sensor Demonstrator Development</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD99: <i>Discrimination Sensor Demonstrator Development</i>	18.362	56.988	73.295	78.608	-	78.608	94.217	74.068	66.263	94.528	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Discrimination Sensor Demonstrator Development (DSDD), areas of concentration include tracking lasers, advanced detectors, infrared sensors, and precision tracking and discrimination algorithms. DSDD demonstrates precision track of advanced threats at extended ranges, simple scene discrimination and then complex scene discrimination through ground, flight, and space demonstrations.

This project develops and tests high-precision advanced sensors to improve identifying, acquiring, tracking and discriminating incoming ballistic missile threats, specifically addressing U.S. Strategic Commands Prioritized Capabilities List requirements. DSDD enhances the BMDS capability to discriminate lethal objects in a threat cluster, and track and hand over the threat object with Aegis Launch on Remote and Engage on Remote precision. The increased kinematics envelope of the SM-3 Block IIA, when combined with Engage on Remote capability, will expand battlespace and increase the number of threats engaged.

This project funds development of next-generation advanced sensor systems to include tracking lasers, specialized detectors, and unique processors and the corollary ground, airborne and space subsystems. These advanced sensors operate at the strategic ranges required to augment BMDS radar, improve the BMDS discrimination capability and provide precision track of large raids. They also track multiple targets simultaneously, substantially reducing the number of sensor assets required for large raids.

MDA tests promising advanced sensor technology at the Mt Wilson Aerospace Facility for Integrated Optical Test (MAFIOT) in conjunction with BMDS tests. The MAFIOT ground testbed provides line of sight viewing of missile launches from Vandenberg AFB and San Nicolas Island. Additionally, MDA will use a transportable ground testbed to test advanced sensors at the Pacific Missile Range Facility (PMRF).

This project includes advanced sensor integration into a high altitude airborne platform, a MDA Configured MQ-9 aircraft, and testing in operationally relevant environments. The MDA Configured MQ-9 aircraft equipped with an advanced sensor provides the MDA a viable quick reaction capability to augment BMDS radar.

The program will leverage the technology demonstrated from the ground and in the air to develop space qualified advanced sensor technology. These cost-effective focal plane array and advanced sensor space components inform future BMDS space layer decisions for persistent tracking and discrimination.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD99 / <i>Discrimination Sensor Demonstrator Development</i>
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MDA will also partner with the Services to develop concepts for the cost effective integration of the sensor technology into limited fielding upgrade kits. The concept information will inform a MDA Product Development Decision for further development and/or limited fielding decisions. These kits could be installed on MQ-9 aircraft deployed in theater to add missile defense capabilities on short notice.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>Title: Discrimination Sensor Demonstrator Development</p> <p align="right">Articles:</p> <p>Description: This project develops an advanced sensor system (tracking laser, advanced detector, infrared sensor, and precision tracking and discrimination algorithms) for participation in BMDS tests under operationally relevant conditions and at operationally relevant ranges. The sensors upgrade will provide capability for tracking and discrimination of lethal objects. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: The increase from FY 2017 to FY 2018 reflects Discrimination Sensor continued build, aircraft integration, and flight qualification.</p> <ul style="list-style-type: none"> - Continue development of the advanced sensor system to include the laser, detector, and unique advanced processor - Conduct missile boost-phase tracking tests with advanced sensor ground testbed -- Develop and improve algorithms and models based on data from advanced sensor ground testbeds -- Conduct airborne advanced sensor ground-truth tests with ground testbed -- Conduct advanced sensor risk reduction tests at ground testbeds - Conduct a flight laboratory test for a compact combined advanced sensor - Complete build and begin integration of a flight qualified laser system onto a MQ-9 aircraft - Solicit a Broad Agency Announcement for advanced sensor for space concept definition <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Complete missile tracking tests with advanced sensor ground testbeds at MAFIOT and PMRF - Transition algorithms and models based on data from advanced sensor ground testbeds to the flight system - Complete development of an advanced sensor system to include the laser, detector and unique advanced processor - Complete integration of flight qualified advanced sensor system components onto a MQ-9 aircraft - Conduct first flight test of the advanced sensor system on a MQ-9 aircraft <p>FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY 2018 to FY 2019 reflects flight qualification efforts leading to Advanced Sensor flight test.</p>	56.988	73.295	78.608
Accomplishments/Planned Programs Subtotals	56.988	73.295	78.608

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD99 / <i>Discrimination Sensor Demonstrator Development</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603176C: <i>Advanced Concepts and Performance Assessment</i>	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
• 0603178C: <i>Weapons Technology</i>	47.403	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603180C: <i>Advanced Research</i>	27.185	20.184	20.365	-	20.365	20.778	21.194	21.652	22.036	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy for MD99, Discrimination Sensor Demonstrator Development consists of a contract(s) to industry via the Advanced Technology Innovation Broad Agency Announcement and competitive procurements and agreements with Federally Funded Research and Development Centers to develop and demonstrate an advanced sensor system in realistic test environments. MDA will leverage agency partner subject matter experts and use government model based assessments for Better Buying Power 3.0 philosophy acquisition decisions.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD99 / <i>Discrimination Sensor Demonstrator Development</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Advanced Sensor Development Support	MIPR	Aerospace, MIT/LL : CA, MA	0.436	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Advanced Sensor Flight Demonstrator	Various	General Atomics, MIT/LL, TBD : C, MA, TBD	0.000	4.209		53.423	Aug 2018	54.464	Oct 2018	-		54.464	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Advanced Sensor Ground Test	MIPR	MIT LL, Aerospace : MA, CA	8.698	6.375		1.673	Oct 2017	5.414	Oct 2018	-		5.414	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Advanced Sensor Laboratory Test	C/CPFF	General Atomics : CA	1.655	6.455		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Advanced	MIPR	MIT LL : MA	0.500	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD99 / <i>Discrimination Sensor Demonstrator Development</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Sensor Performance Analysis Aegis Engage on Remote Concept Assessment															
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Advanced Sensor Performance Analysis Aegis Engage on Remote Hardware in the Loop (HWIL)	MIPR	MIT LL, Aviation and Missile Research, Development, and Engineering Center (AMRDEC) : MA, AL	0.000	5.663		6.100	Nov 2017	5.500	Oct 2018	-		5.500	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Airborne EO/IR Demonstrator	Various	General Atomics, SMDC, SPAWAR : CA, AL	1.708	20.285		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - High Bandwidth Communications	MIPR	SAF/FMBIB Air Force : Washington DC	0.000	6.689	Jun 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			12.997	49.676		61.196		65.378		-		65.378	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD99 / <i>Discrimination Sensor Demonstrator Development</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Agency Operations - Advisory and Assistance Services	C/CPFF	Various : NM, AL	0.241	1.432		3.164	Oct 2017	2.930	Oct 2018	-		2.930	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Agency Operations - Engineering and Technical Services	MIPR	Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Aerospace : AL, CA	1.198	1.071		0.811	Oct 2017	1.560	Oct 2018	-		1.560	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Agency Operations - Civilian Salaries and Travel	Allot	MDA Multi : AL, NM	1.366	2.407		4.804	Oct 2017	5.464	Oct 2018	-		5.464	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Discrimination Sensor Demonstrator Development - Agency Operations - Facility Support	MIPR	377th ABW : NM	0.148	0.163		0.113	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Discrimination	C/CPAF	Northrop Grumman : CO	2.412	2.239		3.207	Feb 2018	3.276	Oct 2018	-		3.276	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD99 / <i>Discrimination Sensor Demonstrator Development</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Sensor Demonstrator Development - Information Management and Technology															
Subtotal			5.365	7.312		12.099		13.230		-		13.230	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	18.362	56.988	73.295	78.608	-	78.608	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD99 / <i>Discrimination Sensor Demonstrator Development</i>
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	Significant Event Complete ▲		Milestone Decision Complete ★		Element Test Complete ◆		System Level Test Complete ●		Complete Activity ◆													
	Significant Event Planned △		Milestone Decision Planned ☆		Element Test Planned ◇		System Level Test Planned ○		Planned Activity ◇													
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023			
Advanced Sensor PDR	▲																					
Advanced Sensor CDR			▲																			
Electro Optical Infrared Launch on Remote Track Ex				△																		
Advanced Sensor Flight Laboratory Test					△																	
Advanced Sensor System Ground Test					△																	
Advanced Sensor CONUS Flight Test																						
Space Advanced Sensor Contract Award																						
Space Advanced Sensor Competitive Design																						
Advanced Sensor Live Fire Track Ex																						
Advanced Sensor Launch on Remote Test																						
Space Advanced Sensor CDR																						
Advanced Sensor Discrimination Upgrades																						
Advanced Sensor Discrimination Flight Test																						

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD99 / <i>Discrimination Sensor Demonstrator Development</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Advanced Sensor PDR	1	2017	1	2017
Advanced Sensor CDR	3	2017	3	2017
Electro Optical Infrared Launch on Remote Track Ex	4	2017	4	2017
Advanced Sensor Flight Laboratory Test	1	2018	1	2018
Advanced Sensor System Ground Test	1	2018	1	2018
Advanced Sensor CONUS Flight Test	4	2019	4	2019
Space Advanced Sensor Contract Award	1	2020	1	2020
Space Advanced Sensor Competitive Design	4	2020	4	2020
Advanced Sensor Live Fire Track Ex	2	2021	2	2021
Advanced Sensor Launch on Remote Test	4	2021	4	2021
Space Advanced Sensor CDR	4	2021	4	2021
Advanced Sensor Discrimination Upgrades	3	2022	3	2022
Advanced Sensor Discrimination Flight Test	3	2023	3	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>				Project (Number/Name) MT99 / <i>Technology Maturation Initiatives Test</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT99: <i>Technology Maturation Initiatives Test</i>	2.070	8.434	0.220	1.982	-	1.982	4.285	1.839	0.000	0.000	0.000	18.830
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Note

N/A

A. Mission Description and Budget Item Justification

Technology Maturation Initiatives (TMI) test project funds the management and execution of TMI system participation in BMDS level tests, hardware-in-the-loop testing, and performance analysis costs for flight test data. This includes test asset shipment to test ranges, labor, travel, range support, and Command Control Battle Management and Communications test support specific to TMI.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Technology Maturation Initiatives Test	8.434	0.220	1.982
Articles:	-	-	-
Description: This project captures the cost to test the systems developed under the Directed Energy Demonstrator Development and Discrimination Sensor Demonstrator Development projects under realistic conditions in conjunction with on-going BMDS testing and through dedicated live fire tests to inform continued testing, full development and limited fielding decisions. This effort also demonstrates potential sensors, systems, and architectures to integrate the BMDS for left and right of launch. Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans: - Complete residual support and data analysis for FEV-01 and FE-01			
FY 2019 Plans: - Conduct system level hardware-in-the-loop testing in conjunction with Enterprise Sensor Laboratory and Experimental Laboratory for a BMDS level test - Shipping, labor, travel, and range support for a BMDS level test			
FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY 2018 to FY 2019 reflects advanced sensor participation in a BMDS test.			
Accomplishments/Planned Programs Subtotals	8.434	0.220	1.982

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MT99 / <i>Technology Maturation Initiatives Test</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603176C: <i>Advanced Concepts and Performance Assessment</i>	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
• 0603178C: <i>Weapons Technology</i>	47.403	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603180C: <i>Advanced Research</i>	27.185	20.184	20.365	-	20.365	20.778	21.194	21.652	22.036	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing

Remarks

D. Acquisition Strategy

The MDA Integrated Master Test Plan establishes and documents the test requirements for the BMDS with the specific focus on collecting the data needed for the Verification, Validation, and Accreditation of the BMDS models and simulations. This paradigm uses critical factor analysis to drive test design, planning, and execution for accrediting models & simulations, which is used to validate and assess system performance. With this test approach, the MDA will establish confidence that the models & simulations used to evaluate the BMDS represent real world behavior, thereby enabling simulation-based performance assessment to verify system functionality.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MT99 / <i>Technology Maturation Initiatives Test</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Technology Maturation Initiatives Test - Technology Maturation Initiative Test - Advanced Demonstration	MIPR	SAF/FMBIB Air Force : Washington DC	0.000	3.586	Jun 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.000	3.586		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Technology Maturation Initiatives Test - Technology Maturation Initiative Test - Command Control Battle Management and Communications/Aegis	Various	Northrop Grumman, Lockheed Martin, Space and Naval Warfare Center, National Air and Space Intelligence Center, Naval Surface Warfare Center Dahlgren Division : CO, CA, OH, VA	1.405	1.874	Apr 2017	0.220	Oct 2017	1.107	Nov 2018	-		1.107	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MT99 / <i>Technology Maturation Initiatives Test</i>
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Technology Maturation Initiatives Test - Technology Maturation Initiative Test - Range Facility Test Prep	MIPR	Pacific Missile Range Facility, Edwards AFB : HI, CA	0.000	0.274		0.000		0.128	Jan 2019	-		0.128	Continuing	Continuing	Continuing
Technology Maturation Initiatives Test - Technology Maturation Initiative Test - Reagan Test Site Prep	MIPR	Reagan Test Site : Kwajalein Atoll	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Technology Maturation Initiatives Test - Technology Maturation Initiative Test - Transportation Costs for MQ-9	MIPR	US Air Force : CA	0.665	2.700		0.000		0.747	Jan 2019	-		0.747	Continuing	Continuing	Continuing
Subtotal			2.070	4.848		0.220		1.982		-		1.982	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.070	8.434	0.220	1.982	-	1.982	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency						Date: February 2018					
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>				Project (Number/Name) MT99 / <i>Technology Maturation Initiatives Test</i>			
Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆	Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇		
				FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	
IMTP v19.1 flight and ground test event details are at a higher classification.				◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MT99 / <i>Technology Maturation Initiatives Test</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>				Project (Number/Name) MC98 / <i>Cyber Operations</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC98: <i>Cyber Operations</i>	0.140	0.331	0.172	0.254	-	0.254	0.177	0.180	0.270	0.275	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Cyber Operations sustains the MDA DoD Risk Management Framework and Controls Validation Testing activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance Manager Plans of Action and Milestones for the MDA Discrimination Sensor Technology mission systems. It maintains the Certification and Accreditation data repository, capturing the DoD Information Assurance Certification and Accreditation Program documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority accreditation decisions) and Plans of Action and Milestones on all MDA information systems.

This project monitors and tracks Cybersecurity mitigations detailed in Information Technology security Plans of Action and Milestones. Activities include preparation of Certification and Accreditation documentation and accreditation recommendations to the MDA Senior Information Assurance Officer /Certification Authority and Designated Approving Authority. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the project are necessary to comply with the Federal Information Security Management Act.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Network / System Certification and Accreditation (C and A)	0.331	0.172	0.254
Articles:	-	-	-
<p>Description: This project sustains the MDA DoD Risk Management Framework (RMF) certification and Controls Validation Testing activities for Technology Maturation Initiatives (TMI).</p> <ul style="list-style-type: none"> - Conduct cyber security and information assurance engineering and architecture planning for TMI information technology systems - Plan and test the information assurance controls for Ballistic Missile Defense System TMI systems - Develop TMI DoD RMF certification and accreditation packages - Conduct controls validation testing for TMI mission systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies - Conduct annual information assurance reviews on the TMI enclaves to assess compliance in implementing and maintaining Information Assurance controls <p>Specific and/or unique accomplishments to each FY are as follows:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MC98 / <i>Cyber Operations</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<i>FY 2018 Plans:</i> - SEE ABOVE.			
<i>FY 2019 Plans:</i> - SEE ABOVE.			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> The increase in FY 2019 from FY 2018 reflects the need for Information Assurance Controls Validation Testing recertification every three years.			
Accomplishments/Planned Programs Subtotals	0.331	0.172	0.254

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603176C: <i>Advanced Concepts and Performance Assessment</i>	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
• 0603178C: <i>Weapons Technology</i>	47.403	5.495	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603180C: <i>Advanced Research</i>	27.185	20.184	20.365	-	20.365	20.778	21.194	21.652	22.036	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy for MC98, Cyber Operations, consists of using MDA civilian employees and the existing competitively awarded contractor support services.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MC98 / <i>Cyber Operations</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network / System Certification and Accreditation (C and A) - Network / System Certification and Accreditation (C and A) - Agency Operations - Civilian Salaries and Travel	Allot	Missile Defense Agency : NM	0.140	0.000		0.172	Oct 2017	0.254		-		0.254	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C and A) - Network / System Certification and Accreditation (C and A) - CDS Implementation	C/CPFF	Northrop Grumman : CO	0.000	0.331	Apr 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.140	0.331		0.172		0.254		-		0.254	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.140	0.331	0.172	0.254	-	0.254	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MC98 / <i>Cyber Operations</i>
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	Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆															
	Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇															
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
Cyber Security Support	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇												
Controls Validation Certification 1												△																				
Controls Validation Certification 2																								△								

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MC98 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Cyber Security Support	1	2017	4	2021
Controls Validation Certification 1	3	2019	3	2019
Controls Validation Certification 2	3	2022	3	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program Wide Support</i>	4.171	4.496	6.620	6.661	-	6.661	7.478	6.456	6.701	7.927	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) reflects proportional changes as a result of changes in Technology Maturation Initiatives program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	4.496	6.620	6.661
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	4.496	6.620	6.661

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy N/A		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA	0.000	0.091	Jul 2017	0.132	Jul 2018	0.101	Jul 2019	-		0.101	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	4.171	4.405	Aug 2017	6.488	Aug 2018	6.560	Jun 2019	-		6.560	Continuing	Continuing	Continuing
Subtotal			4.171	4.496		6.620		6.661		-		6.661	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.171	4.496	6.620	6.661	-	6.661	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency							Date: February 2018																			
Appropriation/Budget Activity 0400 / 4							R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>							Project (Number/Name) MD40 / <i>Program Wide Support</i>												
Significant Event Complete ▲		Milestone Decision Complete ★		Element Test Complete ◆		System Level Test Complete ●		Complete Activity ◆																		
Significant Event Planned △		Milestone Decision Planned ☆		Element Test Planned ◇		System Level Test Planned ○		Planned Activity ◇																		
							FY 2017		FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
MD40 Program-Wide Support							◇◇◇◇◇		◇◇◇◇◇			◇◇◇◇◇			◇◇◇◇◇			◇◇◇◇◇			◇◇◇◇◇			◇◇◇◇◇		

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604115C / <i>Technology Maturation Initiatives</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity
 0400: *Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)*

R-1 Program Element (Number/Name)
 PE 0604181C / *Hypersonic Defense*

COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	75.300	120.444	-	120.444	157.672	142.296	117.381	119.434	0.000	732.527
MD29: <i>Hypersonic Defense</i>	-	0.000	75.300	115.054	-	115.054	150.838	135.886	111.917	114.032	0.000	703.027
MD40: <i>Program Wide Support</i>	-	0.000	0.000	5.390	-	5.390	6.834	6.410	5.464	5.402	0.000	29.500

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

This program element supports a focused program that includes executing the systems engineering process, full kill chain technology identification and maturation, providing analysis and assessment of target of opportunity events, and executing near term sensor and command and control capability upgrades to address defense from hypersonic threats, which pose a significant threat.

The Hypersonic Defense effort will develop and deliver a set of material solutions to address and defeat hypersonic threats informed by a set of near term technology demonstrations. Based on Department of Defense FY 2017 efforts to counter hypersonic threats, MDA will assess architecture alternatives and provide recommendations for future BMDS configurations to keep pace with evolving threats. An integrated set of enhancements provides incremental capability measured by progress and knowledge points in the following areas:

- Establishment of systems engineering needs, requirements, and architecture trade studies to identify alternative material solutions
- Modification of existing BMDS sensors and C2BMC element for hypersonic threats
- Definition of weapon concepts and investments in key technology to enable a broad set of solutions including kinetic and non-kinetic means both right and left of launch
- Execution of a series of sensor technology demonstrations, to include ground, airborne and space-based technology, to inform the development strategy

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604181C / <i>Hypersonic Defense</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	75.300	116.300	-	116.300
Current President's Budget	0.000	75.300	120.444	-	120.444
Total Adjustments	0.000	0.000	4.144	-	4.144
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	4.144	-	4.144

Change Summary Explanation

The increase in FY 2019 from PB18 to PB19 reflects Program Wide Support (PWS) being proportionately reallocated to the Hypersonic Defense program element.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604181C / Hypersonic Defense				Project (Number/Name) MD29 / Hypersonic Defense			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD29: Hypersonic Defense	-	0.000	75.300	115.054	-	115.054	150.838	135.886	111.917	114.032	0.000	703.027
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The Hypersonic Defense effort will develop and deliver a set of material solutions to address and defeat hypersonic threats informed by a set of near term technology demonstrations.

MDA will conduct systems engineering activities required to initiate development of BMDS capabilities to address advanced threats. Efforts will include architecture analysis activities such as a Defense Against Hypersonic Threats Analysis of Alternatives (AoA), jointly conducted with the Office of the Secretary of Defense, Cost Assessment and Program Evaluation, and Services with participation from the Combatant Commands.

MDA will leverage existing sensors and ground infrastructure/Command and Control to quickly demonstrate and deploy a three-phase limited contingency capability to provide real-time warning over the majority of the hypersonic threat profile. The initial limited contingency capability will be fully integrated into the C2BMC program of record. MDA plans to leverage the lessons learned and analysis from this capability development for the design and development of additional sensors for potential advanced threat applications.

To address the weapon technology required to defeat the hypersonic threat, MDA will focus on the development of weapon concepts through competitive development efforts with industry. The concepts and identified technology component risk reduction will formulate the trade space across cost, risk, and performance to inform the requirements development process. The Agency will also extend analysis tools to provide inputs to concept design and requirements development.

MDA will conduct sensor demonstrations and develop sensor technology for hypersonic threats. The demonstrations build on ground, air, and space sensor technology to demonstrate capabilities to detect and track hypersonic threats. Demonstrations will employ tracking capability in all three phases of flight: boost phase using overhead persistent infrared, mid-phase using airborne or space, and terminal phase using ground, airborne, or space tracking. MDA will also conduct pre and post demonstration performance assessment to analyze data collects.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Hypersonic Defense	0.000	75.300	115.054
Articles:	-	-	-
Description: This effort includes the systems engineering, technology development, and near term component capability development activities required to evolve the BMDS to address hypersonic threats, to include architecture analysis, capability			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / <i>Hypersonic Defense</i>	Project (Number/Name) MD29 / <i>Hypersonic Defense</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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<p>roadmap development, and requirements development. It also includes an assessment of existing and new capabilities, identification, development, and demonstration of new technology and capabilities needed across the kill chain in support of architecture alternatives, and their ability to address advanced threats. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Systems Engineering: - Complete and deliver the Defense Against Hypersonic Threats Analysis of Alternatives (AoA) report - Conduct integrated architecture and performance analysis of end-to-end hypersonic threat capabilities based on the outcome of the AoA - Complete analysis and assessments of target of opportunity events - Draft capability roadmap - Complete requirements and initial system integration activities for near term capabilities - Draft initial requirements document</p> <p>Sensors Technology & Demonstration: - Identify and demonstrate sensor technology through: -- Dual airborne passive observation with stereo MDA configured MQ-9 Reapers -- Ground electro-optical/infrared and advanced sensor observations with a Multi-Spectral Targeting System (MTS)-C -- Pre and post mission performance analysis - Award technology demonstration contract - Purchase long lead component hardware required to build and test sensor technologies for hypersonic threat defense applications</p> <p>Weapon Concept Definition: - Initiate development of innovative weapon concepts to address the hypersonic threat set - Deliver multiple initial concepts and identify technology risk reduction efforts</p> <p>Near Term Capability Development - Initiate design and development activities for prototype updates to various BMD sensor algorithms - Conduct design and development activities for C2BMC/BOA changes to provide limited tracking/display of the hypersonic threat.</p> <p>FY 2019 Plans: Systems Engineering: - Conduct integrated architecture and performance analysis of end-to-end hypersonic threat capabilities</p>			
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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / <i>Hypersonic Defense</i>	Project (Number/Name) MD29 / <i>Hypersonic Defense</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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<ul style="list-style-type: none"> - Complete analysis and assessments of target of opportunity events - Complete requirements and initial system integration activities - Finalize capability roadmap - Develop Initial concept requirements <p>Sensors Technology & Demonstration:</p> <ul style="list-style-type: none"> - Identify and demonstrate sensor technology - Test and demonstrate sensor components for future hypersonic applications - Conduct EO/IR sensor-to-tactical network experiments to lower latency of sensor data to user - Ground test data processing and algorithms for wide field of view threat scenes <p>Weapon Concept Definition:</p> <ul style="list-style-type: none"> - Complete joint government and industry concept definition for the hypersonic intercept weapons. The weapons concepts will aid the Agency in establishing the requirements foundation for hypersonic defense - Deliver hypersonic interceptor weapon contractor concept(s) for component technology risk reduction future activities <p>Command and Control, Battle Management, Communication (C2BMC)/ BMDS OPIR Architecture (BOA):</p> <ul style="list-style-type: none"> - Conduct C2BMC 8.2-5 Critical Design Review and complete development and integration for the following Hypersonic Defense capabilities: - Complete design, development, and integration activities for sensor data exploitation tracking algorithms (fielded as a BOA capability), leveraging the initial limited contingency capability enhancements. - Develop Link 16 track forwarding of the hypersonic threat tracks generated by BOA through C2BMC <p>AN/TPY-2:</p> <ul style="list-style-type: none"> - Complete System Engineering, Analysis and Requirements development for initial capability - Initiate Software Design, Development, and Testing for initial capability - Initiate System Engineering, Analysis and Requirements development for objective capability <p>LRDR:</p> <ul style="list-style-type: none"> - Complete System Engineering, Analysis and Requirements development for objective capability - Initiate Software Design and Development for objective capability - Begin incorporation of hypersonic threat defense capabilities into LRDR software Version 2.0 			
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FY 2018 to FY 2019 Increase/Decrease Statement:

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / <i>Hypersonic Defense</i>	Project (Number/Name) MD29 / <i>Hypersonic Defense</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Increase from FY 2018 to FY 2019 is due to initiation of sensor objective capability development.			
Accomplishments/Planned Programs Subtotals	0.000	75.300	115.054

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603176C: <i>Advanced Concepts and Performance Assessment</i>	14.534	12.996	13.017	-	13.017	14.267	14.899	15.235	16.224	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing

Remarks

D. Acquisition Strategy

To optimize BMDS performance, MDA leverages the nation's engineering centers of excellence at government agencies, military Services, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and industry. The executing agents use varying contracting strategies in a flexible manner to maximize their contribution to the BMDS. MDA acquires products and services by competitive means to the extent that is possible, practical and uses the Advanced Technology Broad Area Announcement process to award concept definition contracts.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / Hypersonic Defense	Project (Number/Name) MD29 / Hypersonic Defense
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Hypersonic Defense - BMDS C2BMC/BOA Upgrades	C/Various	Various : AL	0.000	0.000		14.000	Nov 2017	20.270	Nov 2018	-		20.270	Continuing	Continuing	Continuing
Hypersonic Defense - BMDS Sensor Upgrades	SS/CPFF	Raytheon : MA	0.000	0.000		4.100	Nov 2017	14.578	Nov 2018	-		14.578	Continuing	Continuing	Continuing
Hypersonic Defense - BMDS Sensor Upgrades - LRDR	C/FFP	Lockheed Martin : NJ	0.000	0.000		0.000		10.185	Feb 2019	-		10.185	Continuing	Continuing	Continuing
Hypersonic Defense - Performance Assessment for Sensors and Weapons	MIPR	Various : AL	0.000	0.000		6.500	Nov 2017	5.051	Nov 2018	-		5.051	Continuing	Continuing	Continuing
Hypersonic Defense - Sensor Technology	Allot	MDA : AL, NM	0.000	0.000		2.700	Oct 2017	4.100	Oct 2018	-		4.100	Continuing	Continuing	Continuing
Hypersonic Defense - Sensor Technology - EO/IR Tracking Demonstration	C/CPFF	Various : AL, CA	0.000	0.000		3.277	Nov 2017	0.000		-		0.000	0.000	3.277	0.000
Hypersonic Defense - Sensor Technology - OGA	MIPR	Various : AL	0.000	0.000		1.900	Nov 2017	1.900	Nov 2018	-		1.900	Continuing	Continuing	Continuing
Hypersonic Defense - Sensor Technology - Sensor Concept and Development	C/CPIF	Various : AL	0.000	0.000		20.823	Nov 2017	32.011	Nov 2018	-		32.011	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering	Allot	MDA : AL, VA	0.000	0.000		0.500	Oct 2017	2.496	Oct 2018	-		2.496	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering - CSS	C/CPFF	TEAMS : AL, VA	0.000	0.000		2.000	Nov 2017	1.997	Nov 2018	-		1.997	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering - FFRDC/UARC	MIPR	Various : VA, AL	0.000	0.000		2.000	Nov 2017	1.997	Nov 2018	-		1.997	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering - Industry	C/CPAF	Boeing : AL	0.000	0.000		2.500	Nov 2017	2.496	Nov 2018	-		2.496	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / <i>Hypersonic Defense</i>	Project (Number/Name) MD29 / <i>Hypersonic Defense</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Hypersonic Defense - Weapon Concept Definition	C/CPFF	Various : AL	0.000	0.000		15.000	Apr 2018	17.973	Oct 2018	-		17.973	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		75.300		115.054		-		115.054	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	75.300	115.054	-	115.054	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / <i>Hypersonic Defense</i>	Project (Number/Name) MD29 / <i>Hypersonic Defense</i>
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	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
Tracking Demonstration				△																	
Sensor Technology Development and Demo				◇	◇	◇	◇														
Weapons Concept Definition Contract(s) Award					△																
AoA Completion						△															
Weapons Concept Definition					◇	◇	◇	◇													
AN/TPY-2 Initial Capability Development							◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇			
C2BMC Critical Design Review								△													
Sensor Component Delivery								△													
C2BMC Development								◇	◇	◇	◇										
AN/TPY-2 Objective Capability								◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
LRDR Objective Capability								◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Initial Requirements Document Completion									△												
Sensor Component Performance Testing									◇												
AN/TPY-2 CX Software Release										△											
LRDR System Requirements Review										△											
Weapons Technology Risk Reduction Contract(s) Award												△									
Weapons Technology Risk Reduction													◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / <i>Hypersonic Defense</i>	Project (Number/Name) MD29 / <i>Hypersonic Defense</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Tracking Demonstration	1	2018	1	2018
Sensor Technology Development and Demo	1	2018	4	2018
Weapons Concept Definition Contract(s) Award	3	2018	3	2018
AoA Completion	4	2018	4	2018
Weapons Concept Definition	3	2018	2	2019
AN/TPY-2 Initial Capability Development	1	2019	2	2021
C2BMC Critical Design Review	2	2019	2	2019
Sensor Component Delivery	2	2019	2	2019
C2BMC Development	2	2019	1	2020
AN/TPY-2 Objective Capability	2	2019	1	2023
LRDR Objective Capability	2	2019	1	2023
Initial Requirements Document Completion	3	2019	3	2019
Sensor Component Performance Testing	3	2019	3	2019
AN/TPY-2 CX Software Release	4	2019	4	2019
LRDR System Requirements Review	4	2019	4	2019
Weapons Technology Risk Reduction Contract(s) Award	2	2020	2	2020
Weapons Technology Risk Reduction	2	2020	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604181C / Hypersonic Defense				Project (Number/Name) MD40 / Program Wide Support			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: Program Wide Support	-	0.000	0.000	5.390	-	5.390	6.834	6.410	5.464	5.402	0.000	29.500
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2019, Program Wide Support (PWS) was proportionately reallocated to the Hypersonic Defense program element. FY 2020 and out reflects proportional changes as a result of budget changes to this program element.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	0.000	0.000	5.390
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	0.000	0.000	5.390

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / <i>Hypersonic Defense</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / Hypersonic Defense	Project (Number/Name) MD40 / Program Wide Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	Allot	Various : Multi, AL, CA, CO, VA	0.000	0.000		0.000		0.082	Aug 2019	-		0.082	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AK, AL, CA, CO, HI, VA	0.000	0.000		0.000		5.308	Aug 2019	-		5.308	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		5.390		-		5.390	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	0.000	5.390	-	5.390	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / <i>Hypersonic Defense</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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	Significant Event Complete ▲	Significant Event Planned △	Milestone Decision Complete ★	Milestone Decision Planned ☆	Element Test Complete ◆	Element Test Planned ◇	System Level Test Complete ●	System Level Test Planned ○	Complete Activity ◆	Planned Activity ◇				
	FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023	
MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604181C / <i>Hypersonic Defense</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604673C / <i>Pacific Discriminating Radar</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	95.765	-	95.765	164.167	497.630	604.085	402.890	0.000	1,764.537
MD41: <i>Homeland Defense Radar - Hawaii (HDR-H)</i>	-	0.000	0.000	62.221	-	62.221	106.370	258.357	200.158	136.088	0.000	763.194
MD51: <i>Homeland Defense Radar - Pacific (HDR-P)</i>	-	0.000	0.000	33.544	-	33.544	57.797	239.273	403.927	266.802	0.000	1,001.343

Program MDAP/MAIS Code: 362

Note

Beginning in FY 2019 the Homeland Defense Radar - Hawaii (HDR-H) will be realigned to the Pacific Discriminating Radar Program Element 0604673C, Project MD41, from Ballistic Missile Defense Sensors Program Element 0603884C, Project MD41.

Beginning in FY 2019 the Budget Project (MD41) title will change from Pacific Radar to Homeland Defense Radar - Hawaii (HDR-H)

Beginning in FY 2019 funding is requested to establish the Homeland Defense Radar - Pacific (HDR-P) (Formerly known as Medium Range Discriminating Radar (MRDR)) Budget Project (MD51), this effort was previously funded in the Ballistic Missile Defense Sensors Program Element 0603884C.

A. Mission Description and Budget Item Justification

The Pacific Discriminating Radar Program Element is comprised of two new persistent discrimination sensors for the Ballistic Missile Defense System (BMDS) including the Homeland Defense Radar-Hawaii (HDR-H) and the Homeland Defense Radar-Pacific (HDR-P). Both sensors address NORTHCOM and PACOM operational requirements for a near term persistent solution against advancing threats and closes capability gaps throughout the Pacific region. Both sensors provide 24/7 tracking and discrimination capability against increasingly complex threats, improve capability of Ballistic Missile Defense (BMD) interceptors and provide for the defense of the Continental United States, Alaska and Hawaii. The radars will leverage development efforts from other sensor projects to enhance discrimination, tracking, and hit assessment to maximize interceptor usage. The HDR-H final testing, integration and delivery is planned for FY 2023 and the HDR-P will complete testing, integration and delivery in FY 2024.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604673C / <i>Pacific Discriminating Radar</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	95.765	-	95.765
Total Adjustments	0.000	0.000	95.765	-	95.765
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	95.765	-	95.765

Change Summary Explanation

The increase from PB18 to PB19 in FY 2019 reflects the realignment of the Homeland Defense Radar - Hawaii (HDR-H) from the Ballistic Missile Defense Sensors Program Element 0603884C and includes funding for the Homeland Defense Radar - Pacific (HDR-P), a new sensor within the BMDS.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604673C / Pacific Discriminating Radar				Project (Number/Name) MD41 / Homeland Defense Radar - Hawaii (HDR-H)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD41: Homeland Defense Radar - Hawaii (HDR-H)	-	0.000	0.000	62.221	-	62.221	106.370	258.357	200.158	136.088	0.000	763.194
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2018 funding is requested to establish the Pacific Radar Budget Project (MD41).

Beginning in FY 2019 the Budget Project (MD41) title will change from Pacific Radar to Homeland Defense Radar - Hawaii (HDR-H)

A. Mission Description and Budget Item Justification

The mission of the Homeland Defense Radar - Hawaii (HDR-H) program office is to define, develop, acquire, field, and sustain the radar as an element of the BMDS. The initial fielding is planned for FY 2023. The HDR-H provides persistent midcourse discrimination, precision tracking, and hit assessment to support the defense of Hawaii against long-range missile threats. The HDR-H is comprised of an equipment shelter, a Mission Control Facility (MCF) which supports radar operations, and supporting facilities and infrastructure. The radar prime contractor will be responsible for building and fielding the radar equipment with associated cooling system and the radar equipment shelter to include foundation.

The HDR-H will be integrated into the BMDS through the C2BMC system and will feature a scalable and open system architecture to mitigate evolving threats. The radar also supports additional mission areas including Space Situational Awareness.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Homeland Defense Radar - Hawaii (HDR-H)	0.000	0.000	62.221
Articles:	-	-	-
Description: The HDR-H program, previously Pacific Radar, includes requirements development activities associated with systems engineering, hardware and software development, discrimination improvements, design reviews, testing, and Models and Simulation (M&S) efforts for radar development. Efforts include site activation and preparation of site infrastructure for construction activities. The program will develop and integrate C2BMC systems for HDR-H functionality. The program will develop and deliver radar software Build 1 and establish the Independent Verification and Validation (IV&V) lab for testing of operational software. The program includes purchase, manufacture, and test of long lead components. Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / Pacific Discriminating Radar	Project (Number/Name) MD41 / Homeland Defense Radar - Hawaii (HDR-H)

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
N/A			
FY 2019 Plans: -Initiate preparations for system-level Preliminary Design Review (PDR) -Initiate Environmental Impact statements -Complete System Requirements Review (SRR) -Complete Integrated Baseline Review (IBR)			
FY 2018 to FY 2019 Increase/Decrease Statement: Increase in FY 2019 from FY 2018 reflects the Homeland Defense Radar - Hawaii (HDR-H) realignment to the Pacific Discriminating Radar Program Element 0604673C, Project MD41, from Ballistic Missile Defense Sensors Program Element 0603884C, Project MD41.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	62.221

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0603882C: Ballistic Missile Defense Midcourse Defense Segment	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: SENSORS MILCON	166.670	0.000	174.000	-	174.000	0.000	0.000	0.000	0.000	0.000	340.670
• 0603896C: Ballistic Missile Defense Command and Control, Battle Management & Communication	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0604873C: Long Range Discrimination Radar (LRDR)	186.172	357.659	164.562	-	164.562	91.603	78.112	108.167	133.728	Continuing	Continuing
• 0604879C: Ballistic Missile Defense Sensor Test	81.376	101.839	81.001	-	81.001	77.654	68.026	101.091	81.903	Continuing	Continuing
• 31299903: MILCON PLANNING and DESIGN	15.000	0.000	14.184	-	14.184	49.482	38.424	8.009	8.160	0.000	133.259

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / <i>Pacific Discriminating Radar</i>	Project (Number/Name) MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>

D. Acquisition Strategy

The HDR-H acquisition strategy was approved in December 2017. The HDR-H procurement will be the first delivery order of a multi-radar IDIQ contract that will include the full/open competitive award for the HDR-H. Additional radar delivery orders will be awarded based on competitively priced common hardware and software components plus site specific shelter and integration scope. MDA plans to award the HDR-H by 4Q FY 2018 and the prime contractor will manage, develop, build and integrate, test, and field the radar. The prime contract will include other fixed price and cost-reimbursable line items and options in order to properly balance acquisition costs and risks. Performance and cost incentives will be included to motivate contractor performance. The radar prime contractor will deliver a full technical data package, which will enable the government to effectively and affordably sustain the system. The HDR-H is expected to complete DD250 and initial fielding in FY 2023.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / Pacific Discriminating Radar	Project (Number/Name) MD41 / Homeland Defense Radar - Hawaii (HDR-H)
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Homeland Defense Radar - Hawaii (HDR-H) - Communications Integration	SS/CPIF	Lockheed Martin : AL	0.000	0.000		0.000		16.100	Mar 2019	-		16.100	Continuing	Continuing	Continuing
Homeland Defense Radar - Hawaii (HDR-H) - IV&V	MIPR	TBD : TBD	0.000	0.000		0.000		3.145	Feb 2019	-		3.145	Continuing	Continuing	Continuing
Homeland Defense Radar - Hawaii (HDR-H) - Prime Contractor	C/TBD	TBD : TBD	0.000	0.000		0.000		33.976	Jan 2019	-		33.976	Continuing	Continuing	Continuing
Homeland Defense Radar - Hawaii (HDR-H) - Program Office	Various	MDA : AL	0.000	0.000		0.000		6.610	Nov 2018	-		6.610	Continuing	Continuing	Continuing
Homeland Defense Radar - Hawaii (HDR-H) - Site Activation & Studies	C/TBD	TBD : TBD	0.000	0.000		0.000		2.390	Mar 2019	-		2.390	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		62.221		-		62.221	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	0.000	62.221	-	62.221	Continuing	Continuing	N/A

Remarks

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / <i>Pacific Discriminating Radar</i>	Project (Number/Name) MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>
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	Significant Event Complete ▲			Milestone Decision Complete ★			Element Test Complete ◆			System Level Test Complete ●			Complete Activity ◆								
	Significant Event Planned △			Milestone Decision Planned ☆			Element Test Planned ◇			System Level Test Planned ○			Planned Activity ◇								
	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
Homeland Defense Radar - Hawaii (HDR-H)					◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
System Requirements Review (SRR)									△												
Preliminary Design Review (PDR)												△									
Developmental Baseline Review (DBR)												△									
Critical Design Review (CDR)															△						
DD-250																					△
Initial fielding																					△

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / <i>Pacific Discriminating Radar</i>	Project (Number/Name) MD41 / <i>Homeland Defense Radar - Hawaii (HDR-H)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Homeland Defense Radar - Hawaii (HDR-H)	3	2018	4	2023
System Requirements Review (SRR)	3	2019	3	2019
Preliminary Design Review (PDR)	3	2020	3	2020
Developmental Baseline Review (DBR)	4	2020	4	2020
Critical Design Review (CDR)	1	2021	1	2021
DD-250	3	2023	3	2023
Initial fielding	4	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604673C / <i>Pacific Discriminating Radar</i>				Project (Number/Name) MD51 / <i>Homeland Defense Radar - Pacific (HDR-P)</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD51: <i>Homeland Defense Radar - Pacific (HDR-P)</i>	-	0.000	0.000	33.544	-	33.544	57.797	239.273	403.927	266.802	0.000	1,001.343
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2019 funding is requested to establish the Homeland Defense Radar - Pacific (HDR-P) (Formerly known as Medium Range Discriminating Radar (MRDR)) Budget Project (MD51), this effort was previously funded in the Ballistic Missile Defense Sensors Program Element 0603884C.

A. Mission Description and Budget Item Justification

The mission of the Homeland Defense Radar - Pacific (HDR-P) program office is to define, develop, acquire, field, and sustain the radar as an element of the BMDS. Delivery of the HDR-P is planned for 4Q FY24 and it will provide persistent midcourse discrimination, precision tracking, and hit assessment to support the defense of the Homeland against long-range missile threats. The HDR-P is comprised of an equipment shelter housing multiple array faces, a Mission Control Facility (MCF) which supports radar operations, and supporting facilities and infrastructure. The radar prime contractor will be responsible for building and fielding the radar equipment with associated cooling system and the radar equipment shelter to include foundation. Siting surveys will be conducted to determine final recommended site.

The HDR-P will be integrated into the BMDS through the C2BMC system and will feature a scalable and open system architecture to mitigate evolving threats. The radar also supports additional mission areas including Space Situational Awareness.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Homeland Defense Radar - Pacific (HDR-P)	0.000	0.000	33.544
Articles:	-	-	-
Description: The HDR-P program includes requirements development activities associated with systems engineering, hardware and software development, discrimination improvements, design reviews, testing, and Models and Simulation (M&S) efforts for radar development. Efforts include site activation and preparation of site infrastructure for construction activities. The program will develop and integrate C2BMC systems for HDR-P functionality. The program will develop and deliver radar software Build 1 and establish the Independent Verification and Validation (IV&V) lab for testing of operational software. The program includes purchase, manufacture, and test of long lead components. Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans: N/A			
FY 2019 Plans: -Initiate prime contract delivery order award for a multi-faced radar			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / Pacific Discriminating Radar	Project (Number/Name) MD51 / Homeland Defense Radar - Pacific (HDR-P)

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
-Initiate preparation for the HDR-P System Requirements Review (SRR) -Initiate preparation of the HDR-P Integrated Baseline Review (IBR)			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> Increase in FY 2019 from FY 2018 establishes the HDR-P Budget Project (MD51)			
Accomplishments/Planned Programs Subtotals	0.000	0.000	33.544

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>SENSORS MILCON</i>	166.670	0.000	174.000	-	174.000	0.000	0.000	0.000	0.000	0.000	340.670
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	186.172	357.659	164.562	-	164.562	91.603	78.112	108.167	133.728	Continuing	Continuing
• 0604879C: <i>Ballistic Missile Defense Sensor Test</i>	81.376	101.839	81.001	-	81.001	77.654	68.026	101.091	81.903	Continuing	Continuing
• 31299903: <i>MILCON PLANNING and DESIGN</i>	15.000	0.000	14.184	-	14.184	49.482	38.424	8.009	8.160	0.000	133.259

Remarks

D. Acquisition Strategy

The HDR-P acquisition strategy was approved in December 2017. The HDR-P procurement will be part of a multi-radar IDIQ contract that will include the full/open competitive award of the first delivery order for the HDR-H in FY18. MDA plans to award the HDR-P by 4Q FY 2019 and the prime contractor will manage, develop, build and integrate, test, and field the radar. The prime contract will include other fixed price and cost-reimbursable line items and options in order to properly balance acquisition costs and risks. Performance and cost incentives will be included to motivate contractor performance. The radar prime contractor will deliver a full technical data package, which will enable the government to effectively and affordably sustain the system. The HDR-P is expected to complete DD250 in FY 2024 and initial fielding in FY 2025 for BMDS integration and testing.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / <i>Pacific Discriminating Radar</i>	Project (Number/Name) MD51 / <i>Homeland Defense Radar - Pacific (HDR-P)</i>

<u>E. Performance Metrics</u> N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0604673C / Pacific Discriminating Radar				Project (Number/Name) MD51 / Homeland Defense Radar - Pacific (HDR-P)							
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Homeland Defense Radar - Pacific (HDR-P) - Communications Integration	SS/CPIF	Lockheed Martin : AL	0.000	0.000		0.000		5.618	Mar 2019	-		5.618	Continuing	Continuing	Continuing
Homeland Defense Radar - Pacific (HDR-P) - Prime Contract	C/TBD	TBD : TBD	0.000	0.000		0.000		17.000	Jul 2019	-		17.000	Continuing	Continuing	Continuing
Homeland Defense Radar - Pacific (HDR-P) - Program Office	Various	MDA : AL	0.000	0.000		0.000		6.000	Nov 2018	-		6.000	Continuing	Continuing	Continuing
Homeland Defense Radar - Pacific (HDR-P) - Site Activation & Studies	C/TBD	TBD : TBD	0.000	0.000		0.000		4.926	Feb 2019	-		4.926	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		33.544		-		33.544	Continuing	Continuing	N/A
Remarks N/A															
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		0.000		33.544		-		33.544	Continuing	Continuing	N/A
Remarks N/A															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / <i>Pacific Discriminating Radar</i>	Project (Number/Name) MD51 / <i>Homeland Defense Radar - Pacific (HDR-P)</i>
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	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
Homeland Defense Radar - Pacific (HDR-P) Development									◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
System requirements Review (SRR)											△										
Preliminary Design Review (PDR)														△							
Developmental Baseline Review (DBR)														△							
Critical Design Review (CDR)																△					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604673C / <i>Pacific Discriminating Radar</i>	Project (Number/Name) MD51 / <i>Homeland Defense Radar - Pacific (HDR-P)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Homeland Defense Radar - Pacific (HDR-P) Development	4	2019	4	2023
System requirements Review (SRR)	3	2020	3	2020
Preliminary Design Review (PDR)	2	2021	2	2021
Developmental Baseline Review (DBR)	3	2021	3	2021
Critical Design Review (CDR)	1	2022	1	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604873C / <i>Long Range Discrimination Radar (LRDR)</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	176.284	186.172	357.659	164.562	-	164.562	91.603	78.112	108.167	133.728	Continuing	Continuing
MD96: <i>Long Range Discrim Radar (LRDR)</i>	165.225	174.540	341.638	158.597	-	158.597	89.330	75.897	102.762	128.326	Continuing	Continuing
MD40: <i>Program Wide Support</i>	11.059	11.632	16.021	5.965	-	5.965	2.273	2.215	5.405	5.402	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The decrease from FY 2018 to FY 2019 reflects completion of development and manufacturing of radar hardware and transition to on site radar assembly and integration.

A. Mission Description and Budget Item Justification

The mission of the LRDR program is to design, develop, integrate, deliver, field, and sustain the LRDR as an element of the BMDS Increment 6b in support of the Ground-Based Midcourse Defense (GMD) Program's Homeland Defense (HLD) Capability. This capability is representative of LRDR Configuration 1. Initial fielding of the LRDR is planned for 2020 leading to an Operational Capability Declaration in FY 2022. The LRDR is comprised of a LRDR Equipment Shelter (LES), housing two radar array faces, a Mission Control Facility (MCF) which supports radar operations, and supporting facilities and infrastructure. The Secretary of the Air Force approved Clear Air Force Station, Alaska as the LRDR site. The Air Force Space Command (AFSPC) is the designated Lead MAJCOM.

The LRDR operates in the S-band frequency, features scalable and open systems architecture to mitigate evolving threats, and integrates into the BMDS through the Command and Control, Battle Management, and Communications (C2BMC) system. This Program Element includes BMDS threat discrimination improvements to enhance BMDS effectiveness against the evolving threat. The result will be a BMDS architecture more capable of discriminating and intercepting re-entry vehicles with a higher degree of confidence to improve Warfighter shot doctrine, and conserve homeland defense interceptor inventory. LRDR also supports additional mission areas including Space Situational Awareness.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604873C / <i>Long Range Discrimination Radar (LRDR)</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	173.162	357.659	135.187	-	135.187
Current President's Budget	186.172	357.659	164.562	-	164.562
Total Adjustments	13.010	0.000	29.375	-	29.375
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	8.100	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	10.000	0.000			
• SBIR/STTR Transfer	-3.840	0.000			
• FY 2017 Request for Additional Appropriations	-1.250	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	29.375	-	29.375

Change Summary Explanation

The FY 2017 reprogramming of \$+10.000M reflects an increase for demolition and remediation of Ballistic Missile Early Warning System (BMEWS) at Clear Air Force Station (CAFS). The increase from PB18 to PB19 in FY 2019 reflects additional data collection events to anchor Models and Simulation (M&S), pairwise testing for C2BMC lab integration with the LRDR lab, logistics data management and program office operations.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604873C / Long Range Discrimination Radar (LRDR)				Project (Number/Name) MD96 / Long Range Discrim Radar (LRDR)			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD96: Long Range Discrim Radar (LRDR)	165.225	174.540	341.638	158.597	-	158.597	89.330	75.897	102.762	128.326	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

This project provides for the development and initial fielding of a LRDR by 2020 to provide an improved persistent midcourse BMDS discrimination capability in the Pacific sensor architecture. The LRDR will also increase the defensive capacity of the Ground-Based Midcourse Defense (GMD) interceptor inventory and address evolving threats. MDA's request includes funding for the design and development of the LRDR, delivery of spares for initial fielding, system engineering, software development, software Independent Verification and Validation (IV&V), hardware manufacturing, qualification testing, developmental testing support and Modeling and Simulation (M&S) efforts. M&S includes development of LRDR digital simulations and their integration into the BMDS, M&S architecture, and Verification, Validation, and Accreditation (VV&A) of LRDR models. The United States Air Force (USAF) will leverage the LRDR inherent capabilities to augment ancillary missions including Space Object Identification and Space Situational Awareness.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Long Range Discrimination Radar (LRDR)	174.540	341.638	158.597
Articles:	-	-	-
<p>Description: The LRDR program includes requirement development activities associated with systems engineering, software development, discrimination improvements, design reviews, testing, and M&S efforts for radar development. Efforts include LRDR site activation and preparation of site infrastructure for construction activities. The program will develop and integrate C2BMC systems for LRDR functionality. The program will develop, maintain, and deliver radar software Build 1 and establish the Independent Verification and Validation (IV&V) lab for testing of operational software. The program includes purchase, manufacture, integration and test of radar materials. This program will also establish the operational baseline, initiate radar operations and communication, and initiate sustainment operations. The program also includes logistics management; reliability, availability, maintainability (RAM) efforts; data management; and operations support for the LRDR program office. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> -Complete design and purchase hardware: --Conduct system Final Design Review (FDR) and initiate purchasing of design critical components for the Sub-Array Suites (SAS), Radar Processing Group (RPG), and Mission Processing Group (MPG) 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / <i>Long Range Discrimination Radar (LRDR)</i>	Project (Number/Name) MD96 / <i>Long Range Discrim Radar (LRDR)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>--Purchase and receive radar material to include: Transmit Receive (T/R) modules, Wide Band Limiter (WBLR) modules, T/R Low Power Module Circuit Card Assemblies (CCAs), T/R High Power Module CCAs, Power Line Replaceable Units (LRUs), Digital Receiver / Exciter (DREX) LRUs, DREX Radio Frequency (RF) CCAs, DREX Processor CCAs, Column Processors, Long Lead Column Processor CCAs, Subarray Suite Assembly materials, and Synthesizer Cabinets</p> <p>--Initiate qualification and sub-system testing:</p> <p>--Initiate Environmental Qualification testing, Electro-Magnetic Interference (EMI) testing and SAS calibration testing on the LRDR Integration Site (LIS)</p> <p>--Complete Highly Accelerated Life Test (HALT) of radar array power systems</p> <p>--Initiate manufacturing and assembly on Array #1 and #2 and begin Factory Acceptance Testing on Array #1:</p> <p>--Conduct manufacturing review for Sub-Array Suites (SAS) and Front End Electronics (FEE)</p> <p>--Assemble components to include: DREX LRUs, T/R LRUs, Power Supply LRUs, Panel Structure, Radiating Tiles, Circulator CCAs, and Beamformer LRUs</p> <p>--Initiate final SAS and FEE assembly</p> <p>--Deliver Technical Data Package</p> <p>--Deliver 100% Design Drawings for Construction</p> <p>--Complete development and delivery of software Build 1 and transition to software maintenance:</p> <p>--Conduct SW Test Readiness Review (TRR), complete and deliver software Build 1, integrate Build 1 into government IV&V lab and test the operational software build</p> <p>--Deliver Final cyber security mitigation software and final version of diagnostic / evaluation software</p> <p>--Deliver Active Electronic Steered Area (AESA) Radio Frequency (RF) model</p> <p>FY 2019 Plans:</p> <p>Radar Assembly and Integration</p> <p>-- Complete receipt of hardware, manufacturing and assembly of Array #1 and #2</p> <p>-- Complete Factory Acceptance Testing (FAT) on Array #1 and #2</p> <p>-- Continue Front End Electronics Integration into Array #1 and #2 Panels</p> <p>-- Initiate packaging, shipment, emplacement, and installation of Arrays on-site at Clear Air Force Station (CAFS), AK</p> <p>-- Initiate Mission Control Facility (MCF) / LRDR Equipment Shelter (LES) site Integration with MILCON and C2BMC</p> <p>-- Initiate execution of the Transition & Transfer (T2) checklist items including facility walk-throughs and open storage certification</p> <p>-- Initiate Space Missile Defense Command Warfighter training of C2BMC for LRDR functionality in preparation for operational radar</p> <p>-- Initiate Logistics Business Case Analysis and Depot Maintenance Planning</p> <p>-- Complete qualification and subsystem testing</p> <p>-- Complete final SAS assemblies</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / Long Range Discrimination Radar (LRDR)	Project (Number/Name) MD96 / Long Range Discrim Radar (LRDR)

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
-Software -- Complete and deliver software Build 1.1, integrate into government lv&v lab -- Complete software Build 1.1 Formal Qualification Testing (FQT) -- Complete delivery of hardware-in-the-loop (HWIL) components to government ground test lab -- Initiate HWIL pairwise /cycle 2 Testing with C2BMC -- Initiate participation in BMDS ground and flight tests in accordance with the BMDS Integrated Master Test Plan (IMTP) -- Complete final SAS and FEE assembly FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects completion of development and manufacturing of radar hardware and transition to on site radar assembly and integration.			
Accomplishments/Planned Programs Subtotals	174.540	341.638	158.597

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603884C: <i>SENSORS MILCON</i>	166.670	0.000	174.000	-	174.000	0.000	0.000	0.000	0.000	0.000	340.670
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0604879C: <i>Ballistic Missile Defense Sensor Test</i>	81.376	101.839	81.001	-	81.001	77.654	68.026	101.091	81.903	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / Long Range Discrimination Radar (LRDR)	Project (Number/Name) MD96 / Long Range Discrim Radar (LRDR)
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 31299903: MILCON PLANNING and DESIGN	15.000	0.000	14.184	-	14.184	49.482	38.424	8.009	8.160	0.000	133.259

Remarks

D. Acquisition Strategy

The LRDR acquisition strategy, which was approved on January 7, 2015, incorporates robust acquisition practices to ensure delivery of a best value solution that meets mission performance requirements and reduces lifecycle costs. MDA awarded a fixed-price incentive contract to Lockheed Martin Corporation of Moorestown, New Jersey, on October 21, 2015 to design, develop, manufacture, integrate & test, and field the LRDR prime mission equipment. The prime contract included other fixed-price and cost-reimbursable line items and options in order to properly balance acquisition costs and risks. Performance and cost incentives were included to motivate contractor performance. The radar prime contractor will deliver a full technical data package, which will enable the government to effectively and affordably sustain the system. MDA will synchronize the radar development contract efforts with a simultaneous MILCON effort which will be executed through the US Army Corps of Engineers. The LRDR is expected to complete development and initial fielding in 2020 for BMDS integration and testing.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / Long Range Discrimination Radar (LRDR)	Project (Number/Name) MD96 / Long Range Discrim Radar (LRDR)
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Long Range Discrimination Radar (LRDR) - BMEWS Remediation and Removal	MIPR	USACE : AL, AK	0.000	12.610	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Communications Integration	C/TBD	Lockheed Martin : Moorestown, NJ	10.350	3.369	May 2017	10.000	May 2018	4.000	May 2019	-		4.000	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - IV&V	MIPR	AMRDEC : Huntsville, AL	2.438	3.091	Nov 2016	3.100	Nov 2017	3.400	Nov 2018	-		3.400	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Prime Contractor	C/FPIF	Lockheed Martin : Moorestown, NJ	109.312	133.899	Nov 2016	309.981	Nov 2017	113.870	Nov 2018	-		113.870	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Program Office	Various	MDA, JHU/APL, GSA : AL, MA, IL	0.000	10.616	Dec 2016	0.000		10.455	Oct 2018	-		10.455	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Site Activation & Studies	C/TBD	MDA : AL	43.125	10.955	Feb 2017	18.557	Feb 2018	23.412	Feb 2019	-		23.412	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Transition & Transfer	C/TBD	MDA : AL	0.000	0.000		0.000		3.460	Jan 2019	-		3.460	Continuing	Continuing	Continuing
Subtotal			165.225	174.540		341.638		158.597		-		158.597	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	165.225	174.540	341.638	158.597	-	158.597	Continuing	Continuing	N/A

Remarks

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / Long Range Discrimination Radar (LRDR)	Project (Number/Name) MD96 / Long Range Discrim Radar (LRDR)
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	Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆											
	Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇											
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
Long Range Discrimination Radar Capability	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Preliminary Design Review (PDR)	▲																											
Developmental Baseline Review (DBR)				▲																								
Critical Design Review (CDR)				▲																								
Build 1.0 Software Delivery								△																				
Build 1.1 Software Delivery												△																
Initial Fielding																				△								
Technical Capability Declaration (TCD)																								△				
Operational Capability Declaration (OCD)																											△	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / <i>Long Range Discrimination Radar (LRDR)</i>	Project (Number/Name) MD96 / <i>Long Range Discrim Radar (LRDR)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Long Range Discrimination Radar Capability	1	2017	4	2023
Preliminary Design Review (PDR)	2	2017	2	2017
Developmental Baseline Review (DBR)	4	2017	4	2017
Critical Design Review (CDR)	4	2017	4	2017
Build 1.0 Software Delivery	3	2018	3	2018
Build 1.1 Software Delivery	1	2019	1	2019
Initial Fielding	1	2021	1	2021
Technical Capability Declaration (TCD)	3	2021	3	2021
Operational Capability Declaration (OCD)	1	2022	1	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / Long Range Discrimination Radar (LRDR)	Project (Number/Name) MD40 / Program Wide Support
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: Program Wide Support	11.059	11.632	16.021	5.965	-	5.965	2.273	2.215	5.405	5.402	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
Program Wide Support (PWS) reflects proportional changes as a result of budget changes in the Long Range Discrimination Radar program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	11.632	16.021	5.965
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	11.632	16.021	5.965

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / <i>Long Range Discrimination Radar (LRDR)</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy N/A		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / Long Range Discrimination Radar (LRDR)	Project (Number/Name) MD40 / Program Wide Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Facilities and Maintenance SRM (MIPR)	MIPR	Various : Multi: AL, VA, Aust, Japan	5.709	5.873	Nov 2016	9.153	Nov 2017	2.414	Mar 2019	-		2.414	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	0.224	0.236	Jul 2017	0.320	Jul 2018	0.090	Jul 2019	-		0.090	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Sustainment and GPC	Allot	Varios : Multi: AL, CA, CO, VA etc.	0.000	0.000		0.000		1.592	Mar 2019	-		1.592	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : MDA Multi: AL, CO, CA, VA	5.126	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	0.000	5.523	Jul 2017	6.548	Jul 2018	1.869	Jun 2019	-		1.869	Continuing	Continuing	Continuing
Subtotal			11.059	11.632		16.021		5.965		-		5.965	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	11.059	11.632	16.021	5.965	-	5.965	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / <i>Long Range Discrimination Radar (LRDR)</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
	MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

Significant Event Complete ▲
Significant Event Planned △

Milestone Decision Complete ★
Milestone Decision Planned ☆

Element Test Complete ◆
Element Test Planned ◇

System Level Test Complete ●
System Level Test Planned ○

Complete Activity ◆
Planned Activity ◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604873C / <i>Long Range Discrimination Radar (LRDR)</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604874C <i>I Improved Homeland Defense (HLD) Interceptors</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	380.331	247.362	636.430	561.220	-	561.220	485.755	502.023	604.309	635.719	Continuing	Continuing
MD97: <i>Improved HD Interceptors</i>	368.247	236.361	619.060	539.340	-	539.340	462.825	474.430	576.045	607.472	Continuing	Continuing
MD40: <i>Program Wide Support</i>	12.084	11.001	17.370	21.880	-	21.880	22.930	27.593	28.264	28.247	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2018 to FY 2019 reflects completion of Redesigned Kill Vehicle (RKV) module-level design verification testing prior to the component level and system level Critical Design Reviews (CDR) and completion of the RKV/Configuration 2 booster All Up Round Engineering effort.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY2017-26 PA): +\$8.000 million was required to address emergency warfighting requirements in support accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. This is a base budget requirement.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$170.900 million is required to address emergency warfighting requirements in support of 20 additional GBIs in a new missile field (Missile Field #4) and risk reduction for 20 additional GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds prior to critical design review.

A. Mission Description and Budget Item Justification

The Ground-based Midcourse Defense (GMD) element of the Ballistic Missile Defense System (BMDS) provides combatant commanders with a continuously available (24 hours a day, 365 days a year) capability to defend the Homeland against limited Intercontinental Ballistic Missile (ICBM) attacks. The improved Homeland Defense interceptor includes a Redesigned Kill Vehicle (RKV), an improved booster (C3), and All Up Round (AUR) engineering necessary to integrate the RKV with new and existing booster configurations. The RKV improves interceptor reliability, reduces unit cost, improves maintainability in the field, and improves performance against emerging threats.

The C3 booster improves survivability against lightning and threat environments. AUR engineering enables an initial operational capability of RKV integration with existing C1 and C2 boosters and flight testing. When C3 development completes, AUR engineering enables full operational capability of RKV integration with the C3 booster.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY2017-26 PA): +\$8.000M was required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+\$8.000M Project MD97 Improved HD Interceptors: required to accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. This is a base budget requirement.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604874C <i>I Improved Homeland Defense (HLD) Interceptors</i>
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FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$170.900M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+\$75.000M Project MD97 Improved HD Interceptors: required to accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. This is a base budget requirement.

+\$95.900M Project MD97 Improved HD Interceptors: required for risk reduction for 20 additional GBIs, including addition of a non-intercept target for CTV-03 in FY2020 and acceleration of software builds prior to critical design review.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	274.148	465.530	496.414	-	496.414
Current President's Budget	247.362	636.430	561.220	-	561.220
Total Adjustments	-26.786	170.900	64.806	-	64.806
• Congressional General Reductions	-54.802	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	25.000	0.000			
• SBIR/STTR Transfer	-4.984	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	8.000	170.900	0.000	-	0.000
• Other Adjustment	0.000	0.000	64.806	-	64.806

Change Summary Explanation

Increase from PB18 to PB19 in FY 2019 due to addition of RKV risk reduction activities to include adding a non-intercept target for CTV-03 in FY2020 and acceleration of software builds and component qualification prior to CTV-03.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY2017-26 PA): +\$8.000 million was required to address emergency warfighting requirements

in support accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. This is a base budget requirement.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$170.900 million is required to address emergency warfighting requirements in support of 20 additional GBIs in a new missile field (Missile Field #4) and risk reduction for 20 additional GBIs, including addition of a non-intercept target for CTV-03 in FY2020 and acceleration of software builds and component qualification prior to critical design review.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)	PE 0604874C / Improved Homeland Defense (HLD) Interceptors

+\$75.000M Project MD97 Improved HD Interceptors: required to accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. This is a base budget requirement.

+\$95.900M Project MD97 Improved HD Interceptors: required for risk reduction for 20 additional GBIs, including addition of a non-intercept target for CTV-03 in FY2020 and acceleration of software builds prior to critical design review.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604874C / Improved Homeland Defense (HLD) Interceptors				Project (Number/Name) MD97 / Improved HD Interceptors			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD97: Improved HD Interceptors	368.247	236.361	619.060	539.340	-	539.340	462.825	474.430	576.045	607.472	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY2018 to FY 2019 reflects completion of Redesigned Kill Vehicle (RKV) module-level design verification testing prior to the component level and system level Critical Design Reviews (CDR) and completion of the RKV/Configuration 2 booster All Up Round Engineering effort.

A. Mission Description and Budget Item Justification

The Ground-based Midcourse Defense (GMD) element of the Ballistic Missile Defense System (BMDS) provides combatant commanders with a continuously available (24 hours a day, 365 days a year) capability to defend the Homeland against limited Intercontinental Ballistic Missile (ICBM) attacks. The improved Homeland Defense interceptor includes a Redesigned Kill Vehicle (RKV), an improved booster (C3), and All Up Round (AUR) engineering necessary to integrate the RKV with new and existing booster configurations. The RKV improves interceptor reliability, reduces unit cost, improves maintainability in the field, and improves performance against emerging threats. The C3 booster improves survivability against lightning and threat environments. AUR engineering enables an initial operational capability of RKV integration with existing C1 and C2 boosters and flight testing. When C3 development completes, AUR engineering enables full operational capability of RKV integration with the C3 booster.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Improved Homeland Defense (HLD) Interceptor Development	226.144	606.834	524.709
Articles:	-	-	-
<p>Description: HLD development objectives include: redesigning the GMD kill vehicle, implementing tactical booster modifications, and conducting All-Up Round (AUR) system engineering. The RKV will be built with a modular, open architecture and designed with common interfaces and standards, making upgrades easier and broadening MDA's vendor and supplier base. The design for growth allows future upgradability. The Configuration 3 integrated boost vehicle will incorporate enhanced lightning protection, power transient protection, and survivability enhancements. The AUR development approach integrates the RKV with three different 3-stage boost vehicle configurations: C1, C2, and C3. The goal of all of these efforts is to develop and field an integrated set of capabilities to improve the reliability, survivability, lethality, and discrimination to defeat future threats. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> -Complete module and payload critical design reviews to establish the product baseline to ensure the RKV has a reasonable expectation of satisfying the RKV Performance Specification -Conduct an initial IFICS End-to-End Test to demonstrate preliminary communication capability between the RKV and the GMD Ground System 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / <i>Improved Homeland Defense (HLD) Interceptors</i>	Project (Number/Name) MD97 / <i>Improved HD Interceptors</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> -Conduct Integrated Communications Radio KV to KV Integration to demonstrate and validate the design approach of the new RKV communication capability -Conduct Production Highly Accelerated Life Testing to support RKV reliability improvements, identify stable operating and destruct limits, and improve the probability of first pass success during qualification -Conduct KV to KV Antenna demonstrations to characterize engineering parameters, gather data and validate the design approach of the new RKV communication capability -Complete buildup of the qualification unit for testing to demonstrate satisfaction of design requirements to support readiness for flight test and manufacturing -Continue modeling and simulation development and integration to assess RKV performance in preparation for flight test and support of GMD and BMDS assessments -Continue development of kill vehicle algorithms and software, and conduct software independent verification and validation testing at contractor and government facilities to conduct independent testing and analysis ensuring the RKV software meets its requirements and that the delivered software system satisfies requirements, the intended use, and warfighter needs -Continue AUR systems engineering to support the testing and fielding of RKV and C1, C2, and C3 equipped interceptors in order to support an uninterrupted fleet of no fewer than 44 emplaced GBIs for the warfighter -Complete AUR preliminary design to support development of the first RKV flight test (CTV-03) to demonstrate RKV integration and performance in flight test -Accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. -Risk reduction for 20 additional GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> -Complete critical design reviews to establish the product baseline to ensure the RKV satisfies the RKV Performance Specification -Continue In-Flight Interceptor Communications System (IFICS) End-to-End Test to demonstrate communication between the RKV and the GMD Ground System -Conduct Integrated Communications Radio Kill Vehicle (KV) to Kill Vehicle (KV) Integration to demonstrate and validate the design approach of the new RKV communication capability -Conduct Production Highly Accelerated Life Testing to support RKV reliability improvements, identify stable operating and destruct limits, and improve the probability of first pass success during qualification -Continue KV to KV Antenna demonstrations to characterize engineering parameters, gather data and validate the design approach of the new RKV communication capability 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / <i>Improved Homeland Defense (HLD) Interceptors</i>	Project (Number/Name) MD97 / <i>Improved HD Interceptors</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>-Continue development of kill vehicle algorithms and software, and conduct software independent verification and validation testing at contractor and government facilities to conduct independent testing and analysis ensuring the RKV software meets its requirements and that the delivered software system satisfies requirements, the intended use, and warfighter needs</p> <p>-Continue AUR systems engineering to support the testing and fielding of RKV and C1, C2, and C3 equipped interceptors</p> <p>-Accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads.</p> <p>-Acceleration of software builds and design verification testing prior to critical design review to reduce program risk and to take advantage of a target added in CTV-03.</p> <p>-Execute risk reduction strategy by developing a radiation hardened avionics architecture through system engineering, prototype development, and parts testing</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects completion of Redesigned Kill Vehicle (RKV) module-level design verification testing prior to the component level and system level Critical Design Reviews (CDR) and completion of the RKV/Configuration 2 booster All Up Round Engineering effort.</p>			
<p>Title: Program Operations</p> <p>Articles:</p> <p>Description: Program Operations provides for integrated program management of the Improved Homeland Defense Interceptor efforts. This effort includes: Technical and business management support, financial management, cost and schedule performance analysis, cost estimation and analysis, configuration management, and integration activities to ensure the program meets cost, schedule, and performance goals; Ground-based Midcourse Defense (GMD) Redesigned Kill Vehicle (RKV) program compliance with internal and external direction, policies, and regulations to deliver critical capability via a consistent and disciplined process; Mission Assurance and Manufacturing Engineering Program to include quality, configuration management, manufacturing, engineering, and safety in all phases of the system life cycle, throughout the supply chain and at all levels of assembly emphasizing high yield rates which minimize test and rework costs; technical and testing oversight, verification of hardware and software development, quality / safety / mission assurance, integrated logistics support, and government manpower and infrastructure to develop, test, and sustain the RKV. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans:</p>	10.217	12.226	14.631
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / Improved Homeland Defense (HLD) Interceptors	Project (Number/Name) MD97 / Improved HD Interceptors

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- SEE ABOVE.			
FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 due to additional personnel required to lead and manage the RKV program.			
Accomplishments/Planned Programs Subtotals	236.361	619.060	539.340

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0203882C: MD08: GMD O&M	129.281	137.896	143.027	-	143.027	139.319	142.269	145.188	0.000	Continuing	Continuing
• 0603882C: Ballistic Missile Defense Midcourse Defense Segment	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603914C: Ballistic Missile Defense Test	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: Ballistic Missile Defense Targets	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing
• 0604887C: Ballistic Missile Defense Midcourse Defense Segment Test	61.350	76.757	81.934	-	81.934	95.458	82.956	78.715	85.362	Continuing	Continuing

Remarks

D. Acquisition Strategy

MDA is executing an acquisition strategy to develop an integrated RKV with a Cross-Industry team design solution. This concept includes potential production sources from industry and provides a consolidated product that includes the collective knowledge of and leverages capabilities from the industry leaders in kill vehicle design and development. The industry teaming method incorporates the most viable technical approaches from each contractor and allows for combination of resources to shorten the learning curve and reduce the time needed to develop and begin initial production. This strategy allows for industry to provide the best value and best design solution for the MDA while setting the conditions for future competition of production. The development phase is followed by initial production and then a competitive full rate production phase. The competitive production phase encompasses the purchase, production, and the integration of the proven components demonstrated in the development phase and provides competitive benefits to the Government. This strategy allows for industry to provide the best value and best design solution for the MDA while setting the conditions for future competition of production. The Government, as the design authority, retains responsibility for the execution of the program cost, schedule, and the technical performance of the RKV to meet requirements levied on the contractor. The Government has implemented a rigorous systems engineering process to ensure that the design and development efforts meet requirements. The MDA goal is to field the initial production RKV's to recap existing CE-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / <i>Improved Homeland Defense (HLD) Interceptors</i>	Project (Number/Name) MD97 / <i>Improved HD Interceptors</i>
<p>I GBIs and support follow-on BMDS test events by FY2022. This acquisition strategy is documented in the RKV Acquisition Plan signed by the Defense Acquisition Executive in October 2015.</p> <p>In January of 2018 the MDA Director signed an Acquisition Strategy Decision Memorandum (ASDM) changing the acquisition strategy to execute the Missile Defeat and Defense Enhancement scope. The Development and Sustainment Contract (DSC) will continue with the Boeing Company to Q1 FY2024 to build the 20 GBI's and 20 Silo's with supporting test, engineering, software, and performance based logistics scope. This additional capability will provide 64 interceptors by the end of calendar year 2023 as well as maintain operation and support capabilities and support upcoming ground and flight tests. The Justification and Approval for this action was signed by the MDA Director on 2 January 2018.</p> <p>E. Performance Metrics N/A</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / Improved Homeland Defense (HLD) Interceptors	Project (Number/Name) MD97 / Improved HD Interceptors
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Improved Homeland Defense (HLD) Interceptor Development - OGA/FFRDC Booster Avionics Risk Reduction	MIPR	Draper : AL/CA	0.000	0.000		0.000		8.394	Oct 2018	-		8.394	Continuing	Continuing	Continuing
Improved Homeland Defense (HLD) Interceptor Development - PRIME AUR System Engineering and Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.000	0.000		52.032	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Improved Homeland Defense (HLD) Interceptor Development - PRIME RKV Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	297.727	214.114	Nov 2016	522.271	Nov 2017	475.734	Oct 2018	-		475.734	Continuing	Continuing	Continuing
Improved Homeland Defense (HLD) Interceptor Development - Post-Intercept Assessment	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Improved Homeland Defense (HLD) Interceptor Development - Prior year no longer funded in the FYDP	Various	Various : Various	21.114	0.000		0.000		0.000		-		0.000	0.000	21.114	0.000
Improved Homeland Defense (HLD) Interceptor Development - RKV Development Lab and System Support	MIPR	AMRDEC : Redstone Arsenal, AL	26.935	12.030	Nov 2016	32.531	Nov 2017	40.581	Oct 2018	-		40.581	Continuing	Continuing	Continuing
Subtotal			345.776	226.144		606.834		524.709		-		524.709	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / Improved Homeland Defense (HLD) Interceptors	Project (Number/Name) MD97 / Improved HD Interceptors
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Operations - Contract Support Services	C/CPFF	Various AL/AK / CA/CO/VA	11.563	6.567	Oct 2016	6.101	Oct 2017	7.176	Oct 2018	-		7.176	Continuing	Continuing	Continuing
Program Operations - FFRDC Support	MIPR	MIT : LL AL	3.132	0.000		0.426		0.344	Oct 2018	-		0.344	Continuing	Continuing	Continuing
Program Operations - Government Civilian Salaries	MIPR	MDA : AL/VA	3.858	2.263		2.428	Oct 2017	2.364	Oct 2018	-		2.364	Continuing	Continuing	Continuing
Program Operations - Other Government Agencies	MIPR	Various AL/VA : FL/CO	3.178	1.199	Oct 2016	2.996	Oct 2017	4.396	Oct 2018	-		4.396	Continuing	Continuing	Continuing
Program Operations - Prior year no longer funded in the FYDP	Various	Various : Various	0.552	0.000		0.000		0.000		-		0.000	0.000	0.552	0.000
Program Operations - Travel	MIPR	MDA : AL/VA	0.188	0.188	Oct 2016	0.275	Oct 2017	0.351	Oct 2018	-		0.351	Continuing	Continuing	Continuing
Subtotal			22.471	10.217		12.226		14.631		-		14.631	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	368.247	236.361	619.060	539.340	-	539.340	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / Improved Homeland Defense (HLD) Interceptors	Project (Number/Name) MD97 / Improved HD Interceptors
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	Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆															
	Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇															
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
IMTP v19.1 flight and ground test event details are at a higher classification.	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
Preliminary Design Review (PDR)				☆																												
Key Component Critical Design Review (CDR)												☆																				
Critical Design Review (CDR)												☆																				
Complete Qualification Test																△																
C3 System Requirements Review (SRR)																				☆												
C3 Preliminary Design Review (PDR)																								☆								
C3 Critical Design Review (CDR)																												☆				

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / <i>Improved Homeland Defense (HLD) Interceptors</i>	Project (Number/Name) MD97 / <i>Improved HD Interceptors</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023
Preliminary Design Review (PDR)	2	2017	2	2017
Key Component Critical Design Review (CDR)	4	2018	4	2018
Critical Design Review (CDR)	1	2019	1	2019
Complete Qualification Test	4	2019	4	2019
C3 System Requirements Review (SRR)	4	2020	4	2020
C3 Preliminary Design Review (PDR)	4	2021	4	2021
C3 Critical Design Review (CDR)	3	2022	3	2022

Note

Flight test schedule at a higher classification.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / Improved Homeland Defense (HLD) Interceptors	Project (Number/Name) MD40 / Program Wide Support
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: Program Wide Support	12.084	11.001	17.370	21.880	-	21.880	22.930	27.593	28.264	28.247	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) reflects proportional changes as a result of budget changes in the Improved Homeland Defense (HLD) Interceptors program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA-wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	11.001	17.370	21.880
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	11.001	17.370	21.880

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / <i>Improved Homeland Defense (HLD) Interceptors</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy N/A		
E. Performance Metrics N/A		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / Improved Homeland Defense (HLD) Interceptors	Project (Number/Name) MD40 / Program Wide Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various : Multi: AL, VA	4.368	0.000		4.503	Mar 2018	14.724	Mar 2019	-		14.724	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Various	Various : Multi: AL, VA	0.000	0.000		0.430	Jul 2018	0.331	Jul 2019	-		0.331	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi: AL, VA	0.000	5.836		4.677	May 2018	4.573	Mar 2019	-		4.573	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	7.716	5.165	Jul 2017	7.760	Jul 2018	2.252	Jul 2019	-		2.252	Continuing	Continuing	Continuing
Subtotal			12.084	11.001		17.370		21.880		-		21.880	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	12.084	11.001	17.370	21.880	-	21.880	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / <i>Improved Homeland Defense (HLD) Interceptors</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆			
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇			
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
MD40 Program-Wide Support	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604874C / <i>Improved Homeland Defense (HLD) Interceptors</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	128.023	57.567	36.239	61.017	-	61.017	16.917	49.170	51.003	59.759	Continuing	Continuing
MT07: <i>THAAD Test</i>	123.387	54.743	33.321	57.892	-	57.892	16.184	46.955	48.629	57.387	Continuing	Continuing
MD40: <i>Program Wide Support</i>	4.636	2.824	2.918	3.125	-	3.125	0.733	2.215	2.374	2.372	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The increase from FY2018 to FY2019 reflects conducting a full operational flight test in FY2019, vice two non-intercept tracking exercises in FY 2018.

A. Mission Description and Budget Item Justification

Ballistic Missile Defense Terminal Defense Segment Test provides the Terminal High Altitude Area Defense (THAAD) program's participation in Ballistic Missile Defense System (BMDS) Flight Tests and Ground Tests in accordance with the BMDS Integrated Master Test Plan (IMTP). THAAD Test coordinates with Operational Test Agencies, conducts pretest planning, coordination and analysis, conducts flight test operations, performs post-flight test reporting, and performs data distribution and storage.

B. Program Change Summary (\$ in Millions)

	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>
Previous President's Budget	63.444	36.239	68.865	-	68.865
Current President's Budget	57.567	36.239	61.017	-	61.017
Total Adjustments	-5.877	0.000	-7.848	-	-7.848
• Congressional General Reductions	-5.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.877	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-7.848	-	-7.848

Change Summary Explanation

FY 2017 Congressional General Reduction for test delays associated with FTT-18 and FET-01 (previously known as FTT-15).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)
0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>

The decrease in FY 2019 from PB 2018 to PB 2019 reflects aligning budget to final Integrated Master Test Plan requirements for PB 2019.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MT07 / <i>THAAD Test</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT07: <i>THAAD Test</i>	123.387	54.743	33.321	57.892	-	57.892	16.184	46.955	48.629	57.387	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The increase from FY2018 to FY2019 reflects conducting a full operational flight test in FY2019, vice two non-intercept tracking exercises in FY 2018.

A. Mission Description and Budget Item Justification

THAAD Test conducts BMDS Flight Tests and Ground Tests with other BMDS elements (such as Army Navy / Transportable Radar Surveillance (AN/TPY-2), BMDS Command, Control, Battle Management, and Communication (C2BMC), PATRIOT, and Aegis) in accordance with the BMDS IMTP. THAAD Test coordinates with Operational Test Agencies, conducts all pre and post flight test, ground test, cyber security enhancements, and war-games and exercises requirements.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Flight Test Execution	49.401	24.816	46.482
Articles:	-	-	-
<p>Description: Performs all requirements to support flight test execution such as mission planning, pre-flight integration testing, conduct of readiness reviews, test asset transportation, flight test execution and data collection, post flight test reporting and data distribution.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Conduct description efforts to support the following test events in accordance with the IMTP: - Conduct Flight Test Tracking Event-35 (FTX-35) at White Sands Missile Range, which will prove THAAD software build 3.0 and test X86 AN/TPY-2 radar configuration with a THAAD Battery. - Conduct Flight Test Tracking Event-36, which will demonstrate interoperability and develop a coordinated firing solution between THAAD and PATRIOT. - Pre-mission Flight Test Operational-03 Event 2 (FTO-03 E2) (BMDS Operational Flight Test), which will further demonstrate, in an operational scenario, THAAD's ability to conduct coordinated engagements with Aegis and PATRIOT operating with (C2BMC) and forward-based AN/TPY-2 while engaging an Intermediate Range Ballistic Missile. - Flight Test THAAD-15/18 (FTT-15/18) post-test reporting and data distribution. <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Conduct description efforts to support the following test events in accordance with the IMTP: 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MT07 / <i>THAAD Test</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Conduct flight test incorporating THAAD Software Build 3.0, to include Debris Mitigation Phase 2, which will further demonstrate, in an operational scenario, THAAD's ability to conduct coordinated engagements with Aegis and PATRIOT operating with (C2BMC) and forward-based AN/TPY-2 while engaging an Intermediate Range Ballistic Missile.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY2018 to FY2019 reflects conducting a full operational flight test in FY2019, vice two non-intercept tracking exercises in FY 2018.</p>				
<p>Title: Ground Test Execution</p> <p>Description: Ground Test Execution includes:</p> <ul style="list-style-type: none"> - THAAD participation in MDA Ground Test operational scenario events to ensure THAAD's ability to conduct coordinated engagements with Aegis and PATRIOT operating with C2BMC and AN/TPY-2, - Pre-mission planning, pre- and post-mission analyses, reporting, and execution to support BMDS Ground and Flight Test campaigns, and - Continued performance assessments to evaluate system performance and interoperability within the integrated BMDS. Specific and/or unique accomplishments to each FY are as follows: <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Continue THAAD participation in MDA Ground Test operational scenario events GT-07 and GTI-ISR campaigns as described above. - Initiate THAAD participation in MDA Ground Test operational scenario event GTD-08 campaign as described above. - Initiate THAAD participation in ground test system pre-mission analyses for FTO-03 E2. <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Continue THAAD participation in MDA Ground Test operational scenario events GT-07, GT-08 and GTI-ISR campaigns as described above. - Complete THAAD participation in ground test system pre-mission analyses for FTO-03 E2. - Initiation of Continuous Integration of element hardware and software to conduct replication activities prior to hardware-in-the-loop (HWIL) testing. <p>FY 2018 to FY 2019 Increase/Decrease Statement: The increase from FY2018 to FY2019 reflects initiating Continuous Integration of element hardware and software prior to hardware-in-the-loop (HWIL) testing.</p>		1.410	5.076	7.669
		Articles:	-	-
Title: Resources		3.895	2.974	3.279

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MT07 / <i>THAAD Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p align="right"><i>Articles:</i></p> <p>Description: Resources include efforts to: - Provide on-site range support for THAAD maintenance, repair, and pre-mission analysis to ensure THAAD test asset readiness, - Provide data management, facilities operations, and post-test reporting in support of BMDS tests to ensure data collection and readiness for mission execution, and - Continue Performance Assessments to evaluate system performance and interoperability within the integrated BMDS Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>	-	-	-
<p>Title: War-games and Exercises</p> <p align="right"><i>Articles:</i></p> <p>Description: War-games and Exercises support the Combatant Commands (CCMDs) with model and simulations and subject matter expertise during exercise events. Continue to assist in developing/refining Tactics, Techniques, and Procedures and Pre-Planned Responses to incorporate in future events. Demonstrate THAAD capability to the warfighter community in the Integrated and Missile Defense (IAMD) environment. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>	0.037 -	0.455 -	0.462 -
Accomplishments/Planned Programs Subtotals	54.743	33.321	57.892

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MT07 / <i>THAAD Test</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0208866C: MD07: <i>THAAD O&M</i>	72.099	78.761	92.608	-	92.608	98.370	91.579	92.643	94.366	Continuing	Continuing
• 0208866C: MD07: <i>THAAD Procurement</i>	566.504	960.732	469.068	-	469.068	416.343	413.956	424.473	434.439	232.135	3,917.650
• 0603881C: <i>Ballistic Missile Defense Terminal Defense Segment</i>	197.171	292.262	214.173	-	214.173	199.399	197.451	174.161	152.174	Continuing	Continuing

Remarks

D. Acquisition Strategy

THAAD awards Indefinite Delivery Indefinite Quantity (IDIQ) Task Orders on the Advanced Capability Development (ACD) contract for the continuation of THAAD II development and test as described and approved in the MDA Integrated Master Test Plan. The discrete task orders allow management and tracking of IMTP-related work.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MT07 / <i>THAAD Test</i>
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Flight Test Execution - Execution, Support and Planning	MIPR	MDA / AMRDEC / KLC / Wake Island / RTS : AL / CO / AK / HI / Wake Island / Kwaj	64.297	34.620	Oct 2016	15.099	Nov 2017	26.699	Nov 2018	-		26.699	Continuing	Continuing	Continuing
Flight Test Execution - Planning, Analysis, and Execution	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	33.580	14.781	Oct 2016	9.717	Nov 2017	19.783	Nov 2018	-		19.783	Continuing	Continuing	Continuing
Ground Test Execution - BMDS Ground Test Support	MIPR	US Army AMRDEC : Huntsville, AL	10.870	1.410	Oct 2016	5.076	Dec 2017	7.669	Dec 2018	-		7.669	Continuing	Continuing	Continuing
Resources - All Prior Years	Various	Various : Various	5.961	0.000		0.000		0.000		-		0.000	0.000	5.961	0.000
Resources - Test and Range Infrastructure	MIPR	US Army AMRDEC / White Sands Missile Range / Lincoln Labs : Huntsville, AL / White Sands, NM / MA	7.961	3.895	Oct 2016	2.974	Dec 2017	3.279	Dec 2018	-		3.279	Continuing	Continuing	Continuing
War-games and Exercises - Wargames and Exercises	MIPR	MDA / Space and Missile Defense Command : Huntsville, AL	0.718	0.037	Oct 2016	0.455	Nov 2017	0.462	Nov 2018	-		0.462	Continuing	Continuing	Continuing
Subtotal			123.387	54.743		33.321		57.892		-		57.892	Continuing	Continuing	N/A

Remarks
 - Increases in R-3 Cost Category Items related to Flight Test Execution from FY 2018 to FY 2019 are due to non-intercept tracking events being executed in FY 2018, compared to a full operational intercept test planned in FY 2019. In FY 2019 THAAD plans to execute Flight Test Operational-03 Event 2 (FTO-03 E2) and initiate test planning activities for Flight Test THAAD-21 (FTT-21).

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	123.387	54.743	33.321	57.892	-	57.892	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MT07 / <i>THAAD Test</i>
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Remarks N/A									

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MT07 / <i>THAAD Test</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆														
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">FY 2017</th> <th style="width: 25%;">FY 2018</th> <th style="width: 25%;">FY 2019</th> <th style="width: 25%;">FY 2020</th> <th style="width: 25%;">FY 2021</th> <th style="width: 25%;">FY 2022</th> <th style="width: 25%;">FY 2023</th> </tr> </thead> <tbody> <tr> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> </tr> </tbody> </table>					FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇
FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023												
◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇												

IMTP v19.1 flight and ground test event details are at a higher classification.

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MT07 / <i>THAAD Test</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>				Project (Number/Name) MD40 / <i>Program Wide Support</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program Wide Support</i>	4.636	2.824	2.918	3.125	-	3.125	0.733	2.215	2.374	2.372	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) reflects proportional changes as a result of budget changes in Ballistic Missile Defense Terminal Defense Segment Test program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	2.824	2.918	3.125
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	2.824	2.918	3.125

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA, Aust, Japan	0.000	0.024	Jul 2017	0.058	Jul 2018	0.047	Jul 2019	-		0.047	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : VA	4.174	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support International and Materiel and Readiness	MIPR	Various : Multi: AL, VA, Aust, Japan	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	0.462	2.800	Aug 2017	2.860	Aug 2018	3.078	Apr 2019	-		3.078	Continuing	Continuing	Continuing
Subtotal			4.636	2.824		2.918		3.125		-		3.125	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.636	2.824	2.918	3.125	-	3.125	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604876C / <i>Ballistic Missile Defense Terminal Defense Segment Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	166.509	131.012	137.783	95.756	-	95.756	80.684	94.138	146.910	137.601	Continuing	Continuing
MT09: <i>AEGIS BMD Test</i>	164.084	127.014	132.091	92.533	-	92.533	77.119	89.177	142.504	133.198	Continuing	Continuing
MD40: <i>Program Wide Support</i>	2.425	3.998	5.692	3.223	-	3.223	3.565	4.961	4.406	4.403	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

FY 2019 decrease reflects flight tests consistent with the Integrated Master Test Plan (IMTP).

FY 2017 MISSILE DEFEAT ENHANCEMENT REPROGRAMMING (FY17-26 PA): \$46.000 million was required to address emergency warfighting requirements in support of additional SM-3 IIA missile testing. Additional classified details will be provided under a separate cover.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: \$3.315 million is required to address emergency warfighting requirements in support of Aegis SM-3 Block IIA Missile Test.

A. Mission Description and Budget Item Justification

The Aegis Ballistic Missile Defense (BMD) mission is to deliver an enduring, operationally effective, and supportable BMD capability to defend the nation, deployed forces, friends, and allies and to increase this capability by delivering evolutionary improvements as part of Ballistic Missile Defense System (BMDS) upgrades. The Aegis BMD element of the BMDS capitalizes upon and evolves from the existing U.S. Navy Aegis Weapons System (AWS) and Standard Missile (SM) infrastructures. Aegis BMD provides a forward-deployable, mobile capability to detect and track Ballistic Missiles of all ranges and the ability to destroy Short-Range Ballistic Missiles (SRBMs), Medium-Range Ballistic Missiles (MRBMs), and Intermediate-Range Ballistic Missiles (IRBMs) in the midcourse phase of flight in addition to shorter range missiles in the terminal phase of flight. Aegis BMD also provides a Long Range Surveillance and Track (LRS&T) capability to the BMDS. Upgrades to both the Aegis BMD Weapon System and the SM-3 configuration enable Aegis BMD to provide effective and supportable defensive capability against longer range more sophisticated threats and an enduring Aegis Ashore defensive capability.

Proving Missile Defense:

- Working with all U.S. Armed Services that participate in the BMDS level Operational Test Agency (OTA) Team, with the support of the Director of Operational Test and Evaluation (DOT&E), MDA has developed a test program to improve confidence in missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable.
- As part of the MDA's rigorous test program, System Pre-Flight predictions provide confidence in test execution by predicting element performance and exercising element interfaces. System Post-Flight Reconstruction replicates the BMDS configuration, actual environmental conditions, and target dynamics observed in flight to anchor Modeling and Simulation (M&S) results.
- The IMTP is event-oriented and extends until the collection of all identified data is completed ensuring adequate test investments.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	95.012	134.468	73.059	-	73.059
Current President's Budget	131.012	137.783	95.756	-	95.756
Total Adjustments	36.000	3.315	22.697	-	22.697
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-10.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	46.000	3.315	0.000	-	0.000
• Other Adjustment	0.000	0.000	22.697	-	22.697

Change Summary Explanation

The increase in FY 2019 from PB18 to PB19 reflects the support of the flight test schedule consistent with the IMTP.

FY 2017 MISSILE DEFEAT ENHANCEMENT REPROGRAMMING (FY17-26 PA): \$46.000 million was required to address emergency warfighting requirements in support of additional SM-3 IIA missile testing. Additional classified details will be provided under a separate cover.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: \$3.315 million is required to address emergency warfighting requirements in support of Aegis SM-3 Block IIA Missile Test.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>				Project (Number/Name) MT09 / <i>AEGIS BMD Test</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT09: <i>AEGIS BMD Test</i>	164.084	127.014	132.091	92.533	-	92.533	77.119	89.177	142.504	133.198	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Budget Accomplishments are structured for direct traceability to the IMTP and efficient management of testing execution efforts. Test funding falls under the following accomplishments: Aegis BMD Flight Test Execution, Aegis BMD Ground Test Execution, Aegis BMD Test Resources and Engineering & Analysis.

A. Mission Description and Budget Item Justification

The FY 2019 Aegis BMD Test Program will concentrate on critical IMTP flight tests that support the U.S. Navy and European Phased Adaptive Approach (EPAA), Weapon System Certification, and Missile Production Decision requirements. Aegis BMD will concentrate on Aegis BL 9.C2 (BMD 5.x) and Standard Missile SM-3 Block IIA operational testing in FY 2019 to include FTO-03 E2 demonstrating BMDS engagement of an IRBM with CMs using a Regional/Theater BMDS architecture.

Proving Missile Defense:

- Working with the U.S. Navy Integrated Warfare System (IWS) Services' Operational Test Agencies (OTA), with the support of the Director of Operational Test and Evaluation (DOT&E), MDA has developed a test program to improve missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable
- As part of MDA's rigorous test program, System Pre-Flight predictions provide confidence in test execution by predicting element performance and exercising element interfaces. System Post-Flight Reconstruction replicates the Ballistic Missile Defense System configuration and actual environmental conditions and target dynamics observed in flight to anchor M&S results
- The IMTP is event-oriented and extends until the collection of all identified data is completed ensuring adequate test investments

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Aegis BMD Flight Test Execution	83.680	62.455	33.707
Articles:	-	-	-
Description: Aegis BMD Ground Test Program performs comprehensive testing of Aegis BMD Components and their interoperability with the BMDS using accredited M&S that provides the evidence required for the MDA and Combatant Commanders to transition the capability to the Operational Capacity Baseline. More specifically, ground testing is used to collect data for Aegis BMD characterization and assessment, flight test risk reduction, and exploration of scenarios where flight testing is either impracticable or impossible.			
Recurring Accomplishments include:			
-Participate in BMD System Ground Tests to include pre-mission analysis, mission execution, and post-mission analysis.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>	Project (Number/Name) MT09 / <i>AEGIS BMD Test</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>-Conduct planning to ensure BMDS Test Site (BTS) capabilities support Aegis BMD testing, exercises, flight tests, and demonstration requirements. This includes upgrades to the ground testing labs to ensure compliance with operational and test baselines.</p> <p>-Continue testing of U.S. Navy C4I systems and Aegis BMD baselines to ensure BMDS interoperability.</p> <p>-Continue to participate in System Level Ground Testing as an element of the layered BMDS to collect data for Aegis BMD characterization and assessment and exploration of scenarios where flight testing is either impracticable or impossible.</p> <p>-Continue operation support of HWIL M&S for Element ground testing.</p> <p>-Prepare and conduct a Hardware Ground Test of cooled gas Attitude Control System (ACS).</p> <p>-Aegis BMD HWIL lab participation align to the IMTP Ground Test schedule and early integration to provide risk reduction for Ground Test runs for the record and implementation of Continuous Integration and Continuous Agile Testing Concept of Operations (CONOPS) pathfinders.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Decrease from FY 2017 to FY 2018 support the flight test schedule and consistent with the IMTP and emergency warfighting requirements.</p> <p>FY 2019 Plans: Support of flight tests scheduled in the IMTP and Aegis BMD 5.0 with Counter Measures. These operational tests support the U.S. Navy, BMDS Increment 5 - Robust IRBM Defense, and the EPAA for the defense of Europe.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 is in support of reflects support of the flight test schedule consistent with the IMTP.</p>				
Title: Aegis BMD Ground Test Execution		11.489	29.680	27.935
		Articles:	-	-
<p>Description: Aegis BMD Ground Test Program performs comprehensive testing of Aegis BMD Components and their interoperability with the BMDS using accredited M&S that provides the evidence required for the MDA and Combatant Commanders to transition the capability to the Operational Capacity Baseline. More specifically, ground testing is used to collect data for Aegis BMD characterization and assessment, flight test risk reduction, and exploration of scenarios where flight testing is either impracticable or impossible.</p> <p>Recurring Accomplishments include:</p> <p>-Participate in BMD System Ground Tests to include pre-mission analysis, mission execution, and post-mission analysis.</p> <p>-Conduct planning to ensure BMDS Test Site (BTS) capabilities support Aegis BMD testing, exercises, flight tests, and demonstration requirements. This includes upgrades to the ground testing labs to ensure compliance with operational and test baselines.</p>				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>	Project (Number/Name) MT09 / <i>AEGIS BMD Test</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>-Continue testing of U.S. Navy C4I systems and Aegis BMD baselines to ensure BMDS interoperability.</p> <p>-Continue to participate in System Level Ground Testing as an element of the layered BMDS to collect data for Aegis BMD characterization and assessment and exploration of scenarios where flight testing is either impracticable or impossible.</p> <p>-Continue operation support of HWIL M&S for Element ground testing.</p> <p>-Prepare and conduct a Hardware Ground Test of cooled gas Attitude Control System (ACS).</p> <p>-Aegis BMD HWIL lab participation align to the IMTP Ground Test schedule and early integration to provide risk reduction for Ground Test runs for the record and implementation of Continuous Integration and Continuous Agile Testing Concept of Operations (CONOPS) pathfinders.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Increase in funding from FY 2017 to FY 2018 is due to evolving Aegis BMD HWIL lab participation in early integration for Ground Tests, Implementation of Continuous Integration and Continuous Agile Testing Concept of Operations (CONOPS) pathfinders.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The decrease in funding from FY 2018 to FY 2019 is due to decreased Aegis BMD HWIL lab participation in early integration for Ground Tests, Implementation of Continuous Integration and Continuous Agile Testing Concept of Operations (CONOPS) pathfinders.</p>				
Title: Aegis BMD Test Resources		20.118	26.931	18.508
		Articles: -	-	-
<p>Description: This effort provides resources to conduct ground and flight testing to improve confidence in missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable.</p> <p>Recurring Accomplishments include:</p> <ul style="list-style-type: none"> - Provide Core Test and Evaluation support for Aegis BMD test and evaluation missions and laboratories, field activities, range support activities, analysis activities, and shipboard and land-based test site test teams. - Provide Test & Evaluation (T&E) infrastructure support for Aegis BMD Test Missions as reflected in the IMTP to collect truth data for post-event analysis. - Conduct core Element M&S validation and accreditation activities. - Exercise tactical communications during testing to ensure interoperability with the BMDS and Combatant Command (CCMD) systems. 				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>	Project (Number/Name) MT09 / <i>AEGIS BMD Test</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
<p>- Continue core test planning for FY 2017 and FY 2018 Aegis BMD test missions to include assessment of target requirements, development of M&S, and preparation of the range to ensure all missions are executable and apply to the technical program objectives.</p> <p>- Develop and execute risk-reduction activities to minimize or mitigate shipboard and missile test and programs risks.</p> <p>- Develop and execute data collection plans and supporting instrumentation requirements.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Increase in funding from FY 2017 to FY 2018 is due to realignment and consolidation of core test functions including Continuous Agile Testing.</p> <p>FY 2019 Plans: Maintain core test and evaluation capability. Conduct ground and flight testing to improve the missile defense capabilities and ensure the capabilities transferred to the warfighter are effective. Begin Continuous Integration implementation in preparation for Continuous Agile Testing.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The decrease in funding from FY 2018 to FY 2019 is due to realignment and consolidation of core test functions including Continuous Agile Testing.</p>				
Title: Engineering & Analysis		11.727	13.025	12.383
		Articles:	-	-
<p>Description: The Engineering and Analysis effort provides essential BMDS ground and flight test event planning, execution, and evaluation activities for each test event:</p> <p>Recurring Accomplishments:</p> <ul style="list-style-type: none"> - Designing test architecture, defining test objectives and evaluation criteria, defining target requirements, and generating ground and flight test scenarios appropriate to the data collection requirements to assess BMDS performance and anchor M&S. - Producing the threat data for BMDS ground and flight tests. - Coordinating with BMDS OTA to address, coordinate, and disposition test issues to achieve closure through recommended action plans. - Delivering HWIL M&S integration test cases. - Conducting M&S HWIL Integration Benchmark and integrating the BMDS HWIL M&S framework with MDA and non-MDA Elements into the test event BMDS architecture. - Integrating, testing, functionally qualifying, and delivering end-to-end BMDS simulations supporting ground test missions. - Analyzing System-level interoperability. - Conducting modeling and technical analysis for Combatant Command wargames and exercises. 				

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>	Project (Number/Name) MT09 / <i>AEGIS BMD Test</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Utilizing M&S for pre-test assessment, post-test review, and M&S updates. - Providing test configuration management; risk assessments; and anomaly/deficiency review, assessment and closure. - Analyzing test results to identify verification and validation data collection shortfalls and reassigning objectives to future test events as required. - Documenting BMDS test observations for system-level test anomalies and coordinating the resulting BMDS Discrepancy Reports within the Failure Reporting, Analysis, and Corrective Action System (FRACAS) - Providing the Quick Look Brief, Mission Data Review (MDR), and Executive MDR. <p>IMTP and infrastructure tasks include:</p> <ul style="list-style-type: none"> - Providing long-range BMDS IMTP planning and integration strategies related to overarching BMDS analysis product integration. - Upgrading test analysis tools in concert with the BMDS evolution (e.g., Modular Analysis and Reporting Suite (MARS)) to enhance analysis capability and efficiency. - Populating the MARS database with data from the most recently completed tests to support as-built analysis and capability assessments. - Providing engineering analysis process software to include System Coordination and Observation Reporting Environment (SCORE), Software Change Analysis Review Environment (SCARE), File Manager (FileMan), and ManPower Loading (MPL). - Incrementally improving and providing infrastructure, software, and MDA/IA compliance for the RApid Scenario Prototyping (RaSP) capability. <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: FY 2018 increase keeps pace with projected FY 2018-FY 2022 IMTP events.</p> <ul style="list-style-type: none"> - Validate test event data collection and conduct post-test analyses supporting the EPAA Phase 3 Technical Capability Declaration. <p>FY 2019 Plans: Aligned to IMTP events.</p> <ul style="list-style-type: none"> - Validate test event data collection and conduct post-test analyses supporting assessments and fielding decisions for BMDS Increments 5 and 6A <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 keeps pace with projected FY 2019 - FY 2023 IMTP events.</p>			
Accomplishments/Planned Programs Subtotals	127.014	132.091	92.533

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>	Project (Number/Name) MT09 / <i>AEGIS BMD Test</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0604880C: <i>Land Based SM-3 (LBSM3)</i>	40.452	30.486	27.692	-	27.692	29.263	28.370	27.228	28.225	Continuing	Continuing
• 0604881C: <i>AEGIS SM-3 Block IIA Co-Development</i>	102.272	9.739	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	112.011

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / Aegis BMD Test	Project (Number/Name) MT09 / AEGIS BMD Test
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution	MIPR	Various - DT : HI,VA,CA,MA,NC	0.000	0.000		11.825	Dec 2017	4.790	Dec 2018	-		4.790	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09 - CPF	MIPR	COMPACTFLT : HI	0.000	0.000		1.337	Dec 2017	1.300	Dec 2018	-		1.300	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09 - Corvid	SS/CPFF	Corvid : NC	0.000	1.911		1.322	Dec 2017	0.560	Dec 2018	-		0.560	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09 -JHU/APL	SS/CPFF	JHU/APL : Columbia MD	5.194	4.400	Dec 2016	12.315	Dec 2017	4.750	Dec 2018	-		4.750	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09- Corona	MIPR	NSWC Corona : CA	3.165	2.296	Nov 2016	3.200	Dec 2017	1.770	Dec 2018	-		1.770	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-DMEA	MIPR	DMEA : McClellan, CA	0.000	0.000		0.300		0.400		-		0.400	0.000	0.700	0.000
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-L3 Communications	C/CPFF	L3 Communications : Waco, TX	0.000	0.824	Apr 2017	2.100	Dec 2017	1.430	Dec 2018	-		1.430	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NAWC/AD	MIPR	NAWC/AD-PHX Air : Pax River, MD	2.058	0.880	Apr 2017	1.200	Dec 2017	1.870	Dec 2018	-		1.870	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NAWC/PM	MIPR	NAWC/PM : Pt. Mugu, CA	2.150	0.958	Oct 2016	3.505	Dec 2017	0.060	Dec 2018	-		0.060	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / Aegis BMD Test	Project (Number/Name) MT09 / AEGIS BMD Test
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NRL	MIPR	Naval Research Lab : Washington, DC	0.000	0.000		0.450	Dec 2017	0.860	Dec 2018	-		0.860	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NSWC DD	MIPR	NSWC Dahlgren : Dahlgren, VA	1.531	1.262	Dec 2016	1.360	Dec 2017	0.670	Dec 2018	-		0.670	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NSWC CR	MIPR	NSWC Carderock : Potomac, MD	0.000	0.248	Jan 2017	0.800	Dec 2017	6.820	Dec 2018	-		6.820	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-PHD	MIPR	NSWC PHD : Pt. Hueneme, CA	4.935	3.372	Oct 2016	5.420	Dec 2017	6.190	Dec 2018	-		6.190	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-PMRF	MIPR	PMRF Barking Sands : Kauai, HI	5.015	6.750	Oct 2016	8.780	Dec 2017	0.410	Dec 2018	-		0.410	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-SSCPAC	MIPR	SPAWAR : San Diego, CA	1.277	0.515	Nov 2016	1.250	Dec 2017	1.150	Dec 2018	-		1.150	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-Variou	MIPR	Various : HI, VA, CA, MA, NC, NJ, AZ	17.297	46.003	Oct 2016	6.736	Dec 2017	0.327		-		0.327	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-Xontech	C/CPFF	Xontech : Colorado Spring, CO	0.000	0.000		0.555	Dec 2017	0.350	Dec 2018	-		0.350	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Flight Test Execution	SS/CPFF	Lockheed Martin : NJ	1.140	11.167		0.000		0.000		-		0.000	0.000	12.307	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / Aegis BMD Test	Project (Number/Name) MT09 / AEGIS BMD Test
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Aegis BMD Flight Test Execution - Flight Test Execution - RMS	SS/CPFF	Raytheon : AZ	6.400	3.094		0.000		0.000		-		0.000	0.000	9.494	0.000
Aegis BMD Ground Test Execution - ATK	MIPR	ATK : Elkton MD	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - CORONA	MIPR	NSWC Corona : CA	1.450	0.650	Nov 2016	1.500	Nov 2017	0.982	Dec 2018	-		0.982	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - JHU/APL MDA	SS/CPFF	JHU/APL : MDA	0.500	0.000		3.000	Nov 2017	5.355	Dec 2018	-		5.355	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - LM	MIPR	Lockheed Martin : Moorestown, NJ	10.321	6.194	Oct 2016	8.802	Nov 2017	3.570	Dec 2018	-		3.570	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - MDA	MIPR	MDA : Arlington, VA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - PHD	MIPR	NSWC PHD : Pt. Hueneme, CA	1.003	0.331	Nov 2016	1.500	Nov 2017	1.636	Dec 2018	-		1.636	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - SSCPAC	MIPR	SPAWAR : San Diego, CA	7.626	4.314	Oct 2016	14.878	Nov 2017	16.392	Dec 2018	-		16.392	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - APL	SS/CPFF	JHU/APL : Columbia MD	25.484	4.300	Oct 2016	10.031	Nov 2017	6.405	Dec 2018	-		6.405	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD	MIPR	Aegis BMD : VA	0.745	0.000		0.000		0.000		-		0.000	0.000	0.745	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / Aegis BMD Test	Project (Number/Name) MT09 / AEGIS BMD Test
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test Resources - MT09 - Aegis															
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - CORONA	MIPR	NSWC Corona : CA	7.446	3.900	Oct 2016	4.000	Nov 2017	2.865	Dec 2018	-		2.865	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - NAVSEA	MIPR	NAVSEA : VA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - NAWC/PM	MIPR	NAWC/PM : Pt. Mugu, CA	1.200	0.800	Oct 2016	0.830	Nov 2017	0.594	Dec 2018	-		0.594	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - NSWCDD	MIPR	NSWC Dahlgren : Dahlgren, VA	9.257	1.574	Nov 2016	3.500	Nov 2017	2.507	Dec 2018	-		2.507	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - PHD	MIPR	NSWC PHD : Pt. Hueneme, CA	9.050	5.215	Oct 2016	4.000	Nov 2017	2.865	Dec 2018	-		2.865	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - PMRF	MIPR	PMRF Barking Sands : Kauai, HI	1.130	1.245	Jan 2017	1.370	Nov 2017	0.981	Dec 2018	-		0.981	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - SSCPAC	MIPR	SPAWAR : San Diego, CA	3.965	2.157	Oct 2016	1.800	Nov 2017	1.289	Dec 2018	-		1.289	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - Various	MIPR	Various : HI, VA, CA, MA, MD	9.923	0.927	Apr 2017	1.400	Nov 2017	1.002	Dec 2018	-		1.002	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis -	C/CPAF	Northrop Grumman : AL, CO	3.087	1.136	Nov 2016	2.160	Nov 2017	2.121	Nov 2018	-		2.121	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / Aegis BMD Test	Project (Number/Name) MT09 / AEGIS BMD Test
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering & Analysis - Engineering Support															
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - FFRDC/UARC	MIPR	Various : AL, CO, VA	10.523	1.991	Nov 2016	2.305	Nov 2017	2.347	Nov 2018	-		2.347	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - Industry	C/CPAF	Boeing : AL	1.781	1.915	Nov 2016	0.000		0.000		-		0.000	0.000	3.696	0.000
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - OGA	MIPR	AMRDEC : AL	9.431	6.063	Nov 2016	6.760	Nov 2017	6.411	Nov 2018	-		6.411	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis - NME	C/CPAF	Northrop Grumman-JRDC : CO, AL	0.000	0.000		0.500	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis - NME Support	MIPR	SPAWAR : CA	0.000	0.622		1.300	Nov 2017	1.504	Nov 2018	-		1.504	Continuing	Continuing	Continuing
Subtotal			164.084	127.014		132.091		92.533		-		92.533	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	164.084	127.014	132.091	92.533	-	92.533	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>	Project (Number/Name) MT09 / <i>AEGIS BMD Test</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇

	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
IMTP v19.1 flight and ground test event details are at a higher classification.	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>	Project (Number/Name) MT09 / <i>AEGIS BMD Test</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>				Project (Number/Name) MD40 / <i>Program Wide Support</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program Wide Support</i>	2.425	3.998	5.692	3.223	-	3.223	3.565	4.961	4.406	4.403	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) reflects proportional changes as a result of budget changes in the Aegis BMD Test program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	3.998	5.692	3.223
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	3.998	5.692	3.223

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / Aegis BMD Test	Project (Number/Name) MD40 / Program Wide Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA	0.036	0.081	Jul 2017	0.150	Jul 2018	0.049	Jul 2019	-		0.049	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : MDA Multi: AL, CO, CA, VA,	0.000	2.353	Nov 2016	2.784	Nov 2017	2.500		-		2.500	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (FFP)	C/FFP	Various : Multi: AL, CA, CO, VA	2.389	1.563	Jun 2017	2.725	Jun 2018	0.674	Apr 2019	-		0.674	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPR)	MIPR	Various : Multi: AL, CA, CO, VA	0.000	0.001	Dec 2016	0.033	Dec 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			2.425	3.998		5.692		3.223		-		3.223	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.425	3.998	5.692	3.223	-	3.223	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
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	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	143.645	81.376	101.839	81.001	-	81.001	77.654	68.026	101.091	81.903	Continuing	Continuing
MT11: <i>BMDs Radars Test</i>	139.887	76.628	98.437	78.095	-	78.095	74.374	65.052	98.538	79.353	Continuing	Continuing
MD40: <i>Program Wide Support</i>	3.758	4.748	3.402	2.906	-	2.906	3.280	2.974	2.553	2.550	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note
FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$17.600M is required to address emergency warfighting requirements in support of SM-3 Block IIA Missile Test.

A. Mission Description and Budget Item Justification
MDA Sensors executes a robust test program that includes flight and ground tests to support both strategic and regional BMDS capabilities against medium- and long-range threats. The Sensors elements of the Ballistic Missile Defense System (BMDS) Integrated Master Test Plan (IMTP) are intended to demonstrate the integrated missile defense capabilities under development to ensure the capabilities delivered to the Warfighter are operationally effective, suitable, and survivable. The Sensors Test Program Element specifically includes the planning, execution, and analysis of flight and ground tests and the associated infrastructure.

The Sensors test program provides data required for the Technical Capability Declaration for European Phased Adaptive Approach (EPAA) Phase III Robust Intermediate Range Ballistic Missile (IRBM) Defense, Enhanced Homeland Defense, and Mid-term Discrimination Improvements. It supports Operational Test and Evaluation of the regional and strategic BMDS architecture that will be fielded at the end of Calendar Year 2018.

The Sensors test program will support Long Range Discrimination Radar (LRDR) integration into BMDS, GMD Redesigned Kill Vehicle (RKV) developmental testing, mid- and far-term Discrimination Improvements, and Operational Test and Evaluation of the theater/regional and strategic BMDS architecture that will be fielded at the end of Calendar Year 2021.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$17.600M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.
+\$17.600M Project MT11 BMDs Radars Test: required to fund a SM-3 IIA flight test, in FY19, to demonstrate a capability against threat target in support of homeland defense.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	83.250	84.239	65.886	-	65.886
Current President's Budget	81.376	101.839	81.001	-	81.001
Total Adjustments	-1.874	17.600	15.115	-	15.115
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	4.900	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-6.774	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	17.600	0.000	-	0.000
• Other Adjustment	0.000	0.000	15.115	-	15.115

Change Summary Explanation

The FY 2017 reprogramming of +\$6.774M reflects a decrease due to IMTP schedule changes. The increase from PB18 to PB19 in FY 2019 reflects a schedule change to align with the IMTP.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$17.600M is required to address emergency warfighting requirements in support of SM-3 Block IIA Missile Test.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MT11 / <i>BMDS Radars Test</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT11: <i>BMDS Radars Test</i>	139.887	76.628	98.437	78.095	-	78.095	74.374	65.052	98.538	79.353	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

This project provides activities for planning, analysis, and execution of BMDS flight test events, including pre- and post-test ground testing such as Digital and Hardware-in-the-Loop (HWIL) Pre-Mission Tests (PMTs) and Post-Flight Reconstruction (PFR). Sensors Test provides planning, analysis, and execution for BMDS system level ground tests identified in the IMTP. Test infrastructure funding provides for HWIL labs and program management required to operate and maintain a flight and ground test capability.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>Title: Flight Test Execution</p> <p align="right">Articles:</p>	41.761	53.234	28.950
<p>Description: Flight Test Execution includes test planning, pre-flight analysis, transportation of radars, test execution, and post-flight analysis for Sensors' participation in BMDS flight tests in accordance with the BMDS IMTP. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects Sensors participation in BMDS flight tests in accordance with the IMTP</p>	-	-	-
<p>Title: Ground Test Execution</p> <p align="right">Articles:</p>	19.197	28.500	29.833
<p>Description: Ground Test Execution includes event planning, asset integration, execution and post-mission analysis for Sensors' participation in BMDS ground tests in accordance with the BMDS IMTP. Specific and/or unique accomplishments to each FY are as follows:</p>	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MT11 / <i>BMDS Radars Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects Sensors' participation in BMDS ground tests in accordance with the IMTP.</p>			
<p>Title: Test Resources</p> <p align="right">Articles:</p>	15.670 -	16.703 -	19.312 -
<p>Description: Test Resources efforts include configuration and maintenance of Sensors Hardware-in-the-Loops (HWILs) for use in ground test execution (BMDS and element developmental testing) and in BMDS flight test execution pre-mission testing. Test Resources also provide support for evolving Objective Stimulation Framework (OSF) (software upgrades) integration into the BMDS HWIL ground test execution and flight test execution. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE</p> <p>FY 2019 Plans: - SEE ABOVE</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects addition of LRDR test infrastructure.</p>			
Accomplishments/Planned Programs Subtotals	76.628	98.437	78.095

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603179C: <i>Advanced C4ISR</i>	3.489	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.489
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MT11 / <i>BMDS Radars Test</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603898C: <i>Ballistic Missile Defense Joint Warfighter Support</i>	47.402	48.954	48.767	-	48.767	53.418	51.448	54.076	54.061	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603907C: <i>Sea Based X-Band Radar (SBX)</i>	115.201	145.695	149.715	-	149.715	175.013	155.718	129.044	136.390	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0604873C: <i>Long Range Discrimination Radar (LRDR)</i>	186.172	357.659	164.562	-	164.562	91.603	78.112	108.167	133.728	Continuing	Continuing
• 13999903: <i>Planning and Design, Defense Wide</i>	8.233	8.397	8.525	-	8.525	8.822	0.000	0.000	0.000	Continuing	Continuing
• D1400634: <i>Upgrade Early Warning Radar (UEWR), Clear AFS, AK</i>	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Remarks

D. Acquisition Strategy

Test & Evaluation projects use multiple existing development contracts depending on the system(s) involved in the testing.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency												Date: February 2018			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
0400 / 4				PE 0604879C / Ballistic Missile Defense Sensor Test						MT11 / BMDS Radars Test					
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - AN/TPY-2 & SBX BMDS Level Testing	SS/CPAF	Raytheon : MA	45.143	38.602	Mar 2017	38.543	Mar 2018	21.090	Mar 2019	-		21.090	Continuing	Continuing	Continuing
Flight Test Execution - FT Security, Site Activation & Deployments	Various	Various : HI, CO, AL	14.842	3.159	Jan 2017	13.507	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - LRDR BMDS Level Testing	SS/TBD	Lockheed Martin : NJ	0.000	0.000		0.032	Nov 2017	5.568	Jan 2019	-		5.568	Continuing	Continuing	Continuing
Flight Test Execution - UEWR/CD BMDS Level Testing	C/FPIF	deciBel : AL	0.000	0.000		1.152	Nov 2017	2.292	Nov 2018	-		2.292	Continuing	Continuing	Continuing
Ground Test Execution - AN/TPY-2 & SBX BMDS Level Testing	SS/CPFF	Raytheon : MA	34.691	14.344	Feb 2017	20.518	Feb 2018	16.765	Feb 2019	-		16.765	Continuing	Continuing	Continuing
Ground Test Execution - UEWR/CD BMDS Level Testing	C/FPIF	deciBel : AL	7.217	4.853	Jan 2017	7.982	Jan 2018	13.068	Jan 2019	-		13.068	Continuing	Continuing	Continuing
Test Resources - AN/TPY-2 & SBX SSF Integration & Infrastructure, Sys Test Lab	SS/CPFF	Raytheon : MA	27.434	12.893	Dec 2016	12.770	Dec 2017	13.269	Dec 2018	-		13.269	Continuing	Continuing	Continuing
Test Resources - Cyber Win10 Implementation - MDDC Lab Analysis Infrastructure	C/IDIQ	Analytical Services, Inc. : AL	0.825	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test Resources - Cybersecurity - BGTC and SBIRS	C/IDIQ	Northrop Grumman Space & Mission System : CO	1.600	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test Resources - Cybersecurity - Tactical Communication	MIPR	SPAWAR : CA	0.190	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MT11 / <i>BMDs Radars Test</i>
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Environment Segment (TCES)															
Test Resources - LRDR SSF Integration & Infrastructure, Sys Test Lab	C/FFP	Lockheed Martin : NJ	0.000	0.000		0.000		1.973	Jan 2019	-		1.973	Continuing	Continuing	Continuing
Test Resources - UEWR SSF Integration & Infrastructure, Sys Test Lab	C/FPIF	deciBel : AL	7.945	2.777	Nov 2016	3.933	Nov 2017	4.070	Nov 2018	-		4.070	Continuing	Continuing	Continuing
Subtotal			139.887	76.628		98.437		78.095		-		78.095	Continuing	Continuing	N/A

Remarks
N/A

Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals		139.887	76.628	98.437	78.095	-	78.095	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MT11 / <i>BMDS Radars Test</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆														
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇														
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FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023												
◇	◇	◇	◇	◇	◇	◇												

IMTP v19.1 flight and ground test event details are at a higher classification.

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MT11 / <i>BMDS Radars Test</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program Wide Support</i>	3.758	4.748	3.402	2.906	-	2.906	3.280	2.974	2.553	2.550	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
Program Wide Support (PWS) reflects proportional changes as a result of budget changes in the Ballistic Missile Defense Sensor Test Program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	4.748	3.402	2.906
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	4.748	3.402	2.906

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA	0.000	0.074	Jul 2017	0.068	Jul 2018	0.044	Jul 2019	-		0.044	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	MIPR	Various : Multi: AL, VA	3.758	4.674	Aug 2017	3.334	Aug 2018	2.862	Feb 2019	-		2.862	Continuing	Continuing	Continuing
Subtotal			3.758	4.748		3.402		2.906		-		2.906	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.758	4.748	3.402	2.906	-	2.906	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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	Element Test Complete	Element Test Planned	System Level Test Complete	System Level Test Planned	Complete Activity	Planned Activity	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
MD40 Program-Wide Support													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604880C / <i>Land Based SM-3 (LBSM3)</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,092.747	40.452	30.486	27.692	-	27.692	29.263	28.370	27.228	28.225	Continuing	Continuing
MD68: <i>AEGIS Ashore</i>	1,056.153	38.733	26.477	23.033	-	23.033	24.860	24.371	24.863	25.573	Continuing	Continuing
MC68: <i>Cyber Operations</i>	-	0.000	2.643	3.255	-	3.255	2.980	2.618	0.970	1.258	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	36.594	1.719	1.366	1.404	-	1.404	1.423	1.381	1.395	1.394	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The decrease from FY 2018 to FY 2019 reflects reduced site activation funding signifying the planned completion of Poland Site.

A. Mission Description and Budget Item Justification

This program supports development of a Land-Based Standard Missile-3 (LBSM3) capability, hereafter referred to as Aegis Ashore. On 17 September 2009, the President announced an overarching plan to provide regional missile defense to U.S. deployed forces, allies, and partners in Europe called the European Phased Adaptive Approach (EPAA). The EPAA policy specifically defines a timeline to deploy a mix of afloat and land-based Ballistic Missile Defense (BMD) capabilities. Aegis Ashore represents one of these land-based capabilities. The U.S. can also build on current efforts to pursue Phased Adaptive Approaches (PAAs) in the Asia Pacific and the Middle East regions. The PAA tailors U.S. BMD capabilities to specific theater needs enhancing integrated regional missile defenses to protect defended assets against medium, intermediate, and ultimately intercontinental range ballistic missiles.

Aegis Ashore is a key component of EPAA Phases II (Romania) and III (Poland) and provides Aegis BMD capability against short to intermediate-range ballistic missiles in an ashore configuration. Aegis Ashore provides sophisticated engagement strategies and can adapt to threat updates while also being deployed/redeployed worldwide where needed to provide persistent coverage for the Geographic Combatant Commanders. Aegis Ashore re-hosts the required BMD components of a U.S. Navy Destroyer, including: SPY-1 Radio Direction and Ranging (Radar); Vertical Launch System (VLS), Computing Infrastructure; Command Control; Communications; Computers and Intelligence (C4I) Systems; and Operator Consoles.

This program element will continue to modernize, develop, and test Aegis Ashore capability improvements at Aegis Ashore Missile Defense Test Complex (AAMDTC) in Hawaii for implementation at operational sites.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604880C / <i>Land Based SM-3 (LBSM3)</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	43.293	30.486	31.816	-	31.816
Current President's Budget	40.452	30.486	27.692	-	27.692
Total Adjustments	-2.841	0.000	-4.124	-	-4.124
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.834	0.000			
• SBIR/STTR Transfer	-1.007	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-4.124	-	-4.124

Change Summary Explanation

The decrease in FY 2019 from PB18 to PB19 reflects reduced site activation funding signifying the planned completion of Poland Site.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604880C / Land Based SM-3 (LBSM3)				Project (Number/Name) MD68 / AEGIS Ashore			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD68: AEGIS Ashore	1,056.153	38.733	26.477	23.033	-	23.033	24.860	24.371	24.863	25.573	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2018 to FY 2019 reflects site activation activities including: Aegis Weapon System transportation, site laydown area, and reduced material handling services.

A. Mission Description and Budget Item Justification

Deployed sites, referred to as an Aegis Ashore Missile Defense System (AAMDS), will be modified to support future computer program and missile variants in step with the U.S. Navy's Destroyer Modernization Plan. MDA is responsible for maintaining and modernizing the test center at the Pacific Missile Range Facility (PMRF), while the U.S. Navy is responsible for maintaining and modernizing all deployed Aegis Ashore sites. The initial AAMDS deployed to Romania in 2015 employing Aegis BMD 5.0 CU (Capabilities Upgrade) and SM-3 Block IB. A second AAMDS deploys to Poland and is scheduled to become operational in 2018. These sites provide an Aegis Ashore exo-atmospheric defense against short to intermediate-range ballistic missile threats in the later stages of flight. If the threat dictates, additional systems can be purchased and deployed globally.

Research and Development efforts include: required modifications to adapt the Aegis Weapon System for land-based use, modernization in pace with the U.S. Navy's Destroyer Modernization Plan, development and testing of Aegis Ashore capability improvements at the Aegis Ashore Missile Defense Test Complex (AAMDTC) in Hawaii, and modifications, as required, to enhance co-existence with Broadband Wireless Access systems in the European theater.

In support of EPAA Phase III, Aegis Ashore integrates the Aegis BMD 5.1 and Standard Missile (SM-3) Block IIA capabilities into the Aegis Ashore sites. MDA is responsible for any upgrade to BMD capability, BMD specific mission equipment, and integration with existing Ballistic Missile Defense System (BMDS) nodes for all Aegis Ashore sites.

Specific and/or unique accomplishments to each FY are as follows:

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Aegis Weapon System Development	24.175	17.428	18.085
Articles:	-	-	-
Description: This effort maintains and modernizes the AAMDTC at the PMRF in Hawaii. It also develops and tests Aegis Ashore capability improvements prior to implementation at operational sites, and supports SPY-1 Radar and Broadband Wireless Access (BWA) coexistence efforts at Aegis Ashore sites.			
Recurring Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / Land Based SM-3 (LBSM3)	Project (Number/Name) MD68 / AEGIS Ashore
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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<p>- Determine the minimum hardware refresh of element components and spares that are projected to be removed from the production to ensure the test capability at AAMDTC remains current with the U.S Navy's Destroyer Modernization efforts</p> <p>- Provide system engineering, technical, and logistics support for the AAMDS facility and tactical elements to ensure appropriate system adaptation, readiness, availability, and effectiveness</p> <p>- Modernize the AAMDTC Weapons System, C4I, VLS, and other equipment to align with the U.S. Navy's Destroyer Modernization Plan and ensure the test site configuration is ready to support BMDS testing</p> <p>- Maintain Aegis Ashore Technical Data Package with modernization implementation to include drawings and installation plans for U.S. Navy use in implementation at operational sites</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Decrease from FY 2017 to FY 2018 is due to alignment with the U.S. Navy's Destroyer Modernization schedule, to include less hardware purchases.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from 2018 to 2019 reflects additional site maintenance requirements to include spares, repair parts.</p>			
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<p>Title: Site Activation</p> <p>Description: This effort includes site design; environmental studies; unexploded ordnance clearing; spectrum analysis studies; temporary facilities; utilities; administrative communications equipment and services; infrastructure modifications; generator and commercial power; leased vehicles; material handling equipment; generator fuel; supplies, barriers; guard shacks; temporary lighting; transportation of materials and equipment; translators; and emerging requirements as site activation progresses and until sites are transferred to the Navy.</p> <p>Recurring Accomplishments include:</p> <ul style="list-style-type: none"> - Provide site activation for Aegis Ashore site in Poland to include temporary site activation facilities, base operation support, utilities, administrative communications, on-site material handling equipment services, and equipment installation - Conducted activities listed in Description section (above) - Continue providing fuel for facility commissioning activities, backup generators, and on-site vehicle support - Continue providing technical support to facilitate processing facility change proposals and construction modifications - Continue providing post-award technical services (structural, mechanical, and electrical) to ensure quality standards and construction schedule is met 	<p>Articles:</p> <p>14.558</p> <p>-</p>	<p>9.049</p> <p>-</p>	<p>4.948</p> <p>-</p>
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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / Land Based SM-3 (LBSM3)	Project (Number/Name) MD68 / AEGIS Ashore
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>- Continue providing Defense Threat Reduction Agency (DTRA) support to ensure High-Altitude Electromagnetic Pulse (HEMP) validation and verification testing is completed Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: Decrease from FY 2017 to FY 2018 reflects reduced site activation activities to include: Aegis Weapon System transportation, site laydown area, and reduced material handling services.</p> <p>FY 2019 Plans: - SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects reduced site activation funding signifying the planned completion of Poland Site.</p>			
Accomplishments/Planned Programs Subtotals	38.733	26.477	23.033

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0208866C: <i>PROCUREMENT</i>	1,585.399	2,417.504	2,432.004	-	2,432.004	1,945.093	1,669.844	1,294.869	1,486.379	0.000	12,831.092
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0604878C: <i>Aegis BMD Test</i>	131.012	137.783	95.756	-	95.756	80.684	94.138	146.910	137.601	Continuing	Continuing
• 0604881C: <i>AEGIS SM-3</i> <i>Block IIA Co-Development</i>	102.272	9.739	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	112.011

Remarks

D. Acquisition Strategy

Aegis Ashore awarded a contract for an Aegis Ashore Engineering Agent (AAEA). The AAEA is responsible for the design, development, integration and test of the Aegis Weapons System capability into a reconstitutable deckhouse. The AAEA will also support Aegis Ashore deployment to Romania.

The Global Deployment (GD) program office is utilizing Naval Facilities Engineering Command (NAVFAC) and U. S. Corps of Engineers Europe District (Core of Engineers North Atlantic Union) CENAU to award and administer contracts for base operating support, commercial power, temporary site activation facilities, and integrated electronic security systems for Romania and Poland sites.

E. Performance Metrics

Cost Plus Award Fee Contracts

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / Land Based SM-3 (LBSM3)	Project (Number/Name) MD68 / AEGIS Ashore
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Aegis Weapon System Development - AWS Development-NAVFAC	MIPR	NAVFAC : HI	0.000	1.469		0.000		1.954	Nov 2018	-		1.954	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-NAVSEA-MD68	MIPR	NAVSEA-LM/BAE, SPAWAR, NSWC CD : San Diego, CA; Baltimore, MD; Minneapolis, MN	5.162	3.640	Nov 2016	5.000	Nov 2017	2.984	Nov 2018	-		2.984	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-NSWC DD-MD68	MIPR	NSWC Dahlgren : Dahlgren, VA	46.016	0.338	Nov 2016	2.400	Nov 2017	0.500	Nov 2018	-		0.500	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-NSWC PHD-MD68	MIPR	NSWC PHD, NSWC, DOI, Aegis Techrep : CA, NJ, ID, MD, IN	35.393	1.897	Nov 2016	1.803	Nov 2017	1.500	Nov 2018	-		1.500	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-PMRF - MD68	MIPR	PMRF : Hawaii	11.431	1.199	Nov 2016	1.225	Nov 2017	1.100	Nov 2018	-		1.100	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-SPAWAR-MD68	MIPR	SSC PAC : San Diego, CA	43.707	2.272	Nov 2016	7.000	Nov 2017	0.047		-		0.047	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-SSC PAC Pearl Harbor	MIPR	SSC PAC Pearl Harbor : HI	0.000	0.000		0.000		2.500	Nov 2018	-		2.500	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-Various-MD68: No longer funding in the FYDP	Various	Various : AL, VA, CA, APO, HI, NJ	835.051	2.668		0.000		0.000		-		0.000	0.000	837.719	0.000
Aegis Weapon System Development - Aegis	SS/CPIF	MDA Lockheed Martin : Moorestown, NJ	14.368	10.692		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / Land Based SM-3 (LBSM3)	Project (Number/Name) MD68 / AEGIS Ashore
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Weapon System Development - MD68-															
Aegis Weapon System Development - MD68	MIPR	MDA : Arlington, VA	1.076	0.000		0.000		7.500	Nov 2018	-		7.500	Continuing	Continuing	Continuing
Site Activation - DTRA support to construction in Romania and Poland	MIPR	DTRA : Ft. Belvoir, VA	0.350	0.800		0.300	Nov 2017	2.868	Nov 2018	-		2.868	Continuing	Continuing	Continuing
Site Activation - Poland Admin Communication	MIPR	Northrop Grumman : Poland	1.300	0.344	Nov 2016	0.602	Nov 2017	0.437	Nov 2018	-		0.437	Continuing	Continuing	Continuing
Site Activation - Poland Base Operating Support and Commercial Power Contract Development	MIPR	NAVFAC : Poland	1.952	1.745	Dec 2016	2.328	Nov 2017	1.007	Nov 2018	-		1.007	Continuing	Continuing	Continuing
Site Activation - Poland IESS	MIPR	CENAU : Poland	2.975	0.000		0.000		0.000		-		0.000	0.000	2.975	0.000
Site Activation - Poland Temp Facilities Design & Contract Development	MIPR	USACE : Huntsville, AL	2.754	0.244		0.000		0.000		-		0.000	0.000	2.998	0.000
Site Activation - Romania Admin Communications	MIPR	DISA, Scott AFB, : IL	0.526	0.000		0.000		0.000		-		0.000	0.000	0.526	0.000
Site Activation - Romania Base Support Services	MIPR	NAVFAC : Poland	7.045	3.160		0.000		0.000		-		0.000	0.000	10.205	0.000
Site Activation - Romania Integrated Electronic Security System - MD68	MIPR	USACE : Huntsville, AL	4.555	0.139		0.000		0.000		-		0.000	0.000	4.694	0.000
Site Activation - Romania Temp Facilities	MIPR	CENAU : Romania	1.174	0.000		0.000		0.000		-		0.000	0.000	1.174	0.000
Site Activation - Site Activation - MD68	MIPR	Various : Various	41.318	0.295		0.000		0.000		-		0.000	0.000	41.613	0.000
Site Activation - Site Activation – Transportation of Aegis Weapon System	MIPR	SDDC : Scotts AFB, IL	0.000	5.786	Jan 2017	0.872	Nov 2017	0.012	Nov 2018	-		0.012	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / Land Based SM-3 (LBSM3)	Project (Number/Name) MD68 / AEGIS Ashore
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Site Activation - Site Activation- Poland Admin Communications	MIPR	DISA : Scott AFB, IL	0.000	0.000		0.160	Nov 2017	0.009	Nov 2018	-		0.009	Continuing	Continuing	Continuing
Site Activation - Site Activation- Poland Material Handling Services	MIPR	NAVFAC : Naples, Italy	0.000	0.000		2.195	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Site Activation - Site Activation- Poland Site Laydown	MIPR	NAVFAC : Naples, Italy	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
Site Activation - USACE in-house support in Poland	MIPR	CEHNC : Huntsville, AL	0.000	1.131	Oct 2016	0.800	Oct 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Site Activation - USACE support in Poland	MIPR	CENAU : Poland	0.000	0.914	Oct 2016	1.792	Oct 2017	0.615	Nov 2018	-		0.615	Continuing	Continuing	Continuing
Subtotal			1,056.153	38.733		26.477		23.033		-		23.033	Continuing	Continuing	N/A

Remarks
Increase from FY 2017 to FY 2018 for AWS Development- SSC PAC - MD68 due to C4I upgrade procurements and installations.

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,056.153	38.733	26.477	23.033	-	23.033	Continuing	Continuing	N/A

Remarks
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for inactive contracts, MIPRs, and civilian salaries on the R-3.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / <i>Land Based SM-3 (LBSM3)</i>	Project (Number/Name) MD68 / <i>AEGIS Ashore</i>
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	Significant Event Complete ▲				Milestone Decision Complete ★				Element Test Complete ◆				System Level Test Complete ●				Complete Activity ◆															
	Significant Event Planned △				Milestone Decision Planned ☆				Element Test Planned ◇				System Level Test Planned ○				Planned Activity ◇															
	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
IMTP v19.1 flight and ground test event details are at a higher classification.	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇
B/L 5.1 Certification Testing		◇	◇	◇	◇	◇	◇	◇																								
Facility Support for NAVEUR Exercise					◇	◇	◇	◇	◇																							
AAMDTC Upgrades									◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / <i>Land Based SM-3 (LBSM3)</i>	Project (Number/Name) MD68 / <i>AEGIS Ashore</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023
B/L 5.1 Certification Testing	2	2017	4	2018
Facility Support for NAVEUR Exercise	1	2018	1	2019
AAMDTC Upgrades	4	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604880C / Land Based SM-3 (LBSM3)				Project (Number/Name) MC68 / Cyber Operations			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC68: <i>Cyber Operations</i>	-	0.000	2.643	3.255	-	3.255	2.980	2.618	0.970	1.258	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase reflects DoD mandated cyber requirements. Funding supports the upgrade and modernization of existing systems.

A. Mission Description and Budget Item Justification

The funds in this project sustain Missile Defense Agency (MDA) DoD Information Assurance Certification and Accreditation Program (DIACAP) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance Manager (PM/IAM) Plans of Action and Milestones (POA&Ms) for MDA Aegis Ballistic Missile Defense (BMD) mission systems. It maintains the Certification and Accreditation (C&A) data repository, capturing the DIACAP documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) on all MDA Information Systems.

Specific and/or unique accomplishments to each FY are as follows:

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Network/System Certification and Accreditation (C&A)	0.000	2.643	3.255
Articles:	-	-	-
<p>Description: Monitor and track cybersecurity mitigation detailed in Information Technology Security Guidance. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Assurance Officer (SIAO)/ Certification Authority (CA) and DAA. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).</p> <p>Recurring Accomplishments:</p> <ul style="list-style-type: none"> - Provide Cybersecurity engineering and architecture requirements planning for Aegis BMD systems - Coordinate the development and implementation of Aegis BMD Risk Management Framework (RMF) accreditation packages - Conduct regular Controls Validation Testing (CVT) of Aegis BMD systems and provide a Risk Assessment Report (RAR) to mitigate cybersecurity deficiencies - Conduct annual cybersecurity reviews on the Aegis BMD systems to assess compliance in implementing and maintaining RMF controls - Implement HW/SW to conduct continuous daily monitoring - Conduct monthly reviews of systems in eMass - Provide daily management of eMass 			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / <i>Land Based SM-3 (LBSM3)</i>	Project (Number/Name) MC68 / <i>Cyber Operations</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Specific and/or unique accomplishments to each FY are as follows:			
<p><i>FY 2018 Plans:</i> Increase from FY 2017 to FY 2018 reflects DoD mandated cyber requirements. Funding supports the upgrade and modernization of existing systems to support the requirements. - Conduct Fidelis Cybersecurity at PMRF: Surface hardening and protection for the Aegis Weapons System at Automated Digital Network System (ADNS)</p> <p><i>FY 2019 Plans:</i> - Install Global Positioning System (GPS)Based Positioning, Navigation and Timing Service (GPNTS) - Purchase Consolidated Afloat Networks and Enterprise Services (CANES)</p> <p><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> Increase from FY 2018 to FY 2019 reflects the installation and purchase of cyber system improvements.</p>			
Accomplishments/Planned Programs Subtotals	0.000	2.643	3.255

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

Full and Open contract support through Missile Defense Agency Program Management Office.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / Land Based SM-3 (LBSM3)	Project (Number/Name) MC68 / Cyber Operations
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network/System Certification and Accreditation (C&A) - Cyber Operations	MIPR	PMRF : HI	0.000	0.000		2.643	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - NSWC Corona	MIPR	NSWC Corona : CA	0.000	0.000		0.000		0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - NSWC Philadelphia	MIPR	Pennsylvania, PA : NSWC Philadelphia	0.000	0.000		0.000		0.250	Nov 2018	-		0.250	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - SPAWAR	MIPR	SPAWAR : CA	0.000	0.000		0.000		2.755	Nov 2018	-		2.755	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		2.643		3.255		-		3.255	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	2.643	3.255	-	3.255	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / <i>Land Based SM-3 (LBSM3)</i>	Project (Number/Name) MC68 / <i>Cyber Operations</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆														
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">FY 2017</th> <th style="width: 10%;">FY 2018</th> <th style="width: 10%;">FY 2019</th> <th style="width: 10%;">FY 2020</th> <th style="width: 10%;">FY 2021</th> <th style="width: 10%;">FY 2022</th> <th style="width: 10%;">FY 2023</th> </tr> <tr> <td>Cyber Operations</td> <td>◇◇◇◇◇◇◇◇</td> <td>◇◇◇◇◇◇◇◇</td> <td>◇◇◇◇◇◇◇◇</td> <td>◇◇◇◇◇◇◇◇</td> <td>◇◇◇◇◇◇◇◇</td> <td>◇◇◇◇◇◇◇◇</td> </tr> </table>					FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cyber Operations	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇
FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023												
Cyber Operations	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇	◇◇◇◇◇◇◇◇												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / <i>Land Based SM-3 (LBSM3)</i>	Project (Number/Name) MC68 / <i>Cyber Operations</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Cyber Operations	1	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604880C / Land Based SM-3 (LBSM3)				Project (Number/Name) MD40 / Program-Wide Support			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	36.594	1.719	1.366	1.404	-	1.404	1.423	1.381	1.395	1.394	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) reflects proportional changes as a result of budget changes in the Land Based SM3 program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	1.719	1.366	1.404
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	1.719	1.366	1.404

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / <i>Land Based SM-3 (LBSM3)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / Land Based SM-3 (LBSM3)	Project (Number/Name) MD40 / Program-Wide Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Facilities and Maintenance (MIPR)	MIPR	Various; Multi : AL, CA, CO, VA	11.024	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Facilities and Maintenance (Reqn)	Reqn	Various; Multi : AL, CA, CO, VA	4.383	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various: Multi : AL, CA, CO, VA	1.938	0.035	Jul 2017	0.027	Jul 2018	0.021	Jul 2019	-		0.021	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	18.728	1.684	Aug 2017	1.339	Aug 2018	1.383	Mar 2019	-		1.383	9.005	32.139	0.000
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	MIPR	Department of State; : Washington, DC, Japan, Australia	0.181	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	Various : Multi:AL,VA	0.340	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			36.594	1.719		1.366		1.404		-		1.404	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	36.594	1.719	1.366	1.404	-	1.404	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / <i>Land Based SM-3 (LBSM3)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
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	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604880C / <i>Land Based SM-3 (LBSM3)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604881C / <i>AEGIS SM-3 Block IIA Co-Development</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	2,215.425	102.272	9.739	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2,327.436
MD09: <i>SM-3 Block IIA Co-Development</i>	2,107.669	88.130	8.816	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2,204.615
MT09: <i>SM-3 Block IIA Co-Development Test</i>	34.551	11.424	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	45.975
MD40: <i>Program-Wide Support</i>	73.205	2.718	0.923	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	76.846

Program MDAP/MAIS Code: 362

Note

Decrease in funding from FY 2018 to FY 2019 due to completion of the Aegis SM-3 Block IIA Co-Development Program.

A. Mission Description and Budget Item Justification

The Aegis Ballistic Missile Defense (BMD) mission is to deliver an operationally effective and supportable BMD capability to defend the nation, deployed forces, and allies. Aegis BMD aims to increase this capability by delivering evolutionary improvements as part of Ballistic Missile Defense System (BMDS) upgrades. Aegis BMD provides a forward-deployable, mobile capability to detect and track ballistic missiles of all ranges, and the ability to destroy Short-Range Ballistic Missiles (SRBM), Medium-Range Ballistic Missiles (MRBM), and Intermediate-Range Ballistic Missiles (IRBM) in the midcourse phase of flight. Upgrades to both the Aegis BMD Weapon System and the Standard Missile-3 (SM-3) configuration enable Aegis BMD to provide effective, supportable defensive capability against longer range, more sophisticated threats and an enduring Aegis Ashore defensive capability.

Beginning in 2006, Aegis BMD and the Japanese Ministry of Defense (JMOD) have undertaken an SM-3 Cooperative Development (SCD) Project. The objective of the SCD project is the development and initial at-sea flight test of the SM-3 Block IIA. The U.S. and Japan will bear equitable burden to complete the project, as documented in the U.S./Japan Memorandum of Understanding (MOU) SCD Annex. Each nation will fund the full extent of its participation in the project. No funds are transferred between the U.S. and Japan under the MOU.

The SM-3 Block IIA provides important improvements over SM-3 Block IB capability, including increased velocity and range provided by a 21-inch diameter rocket motor propulsion stack, more than doubled seeker sensitivity, and more than tripled divert capability incorporated in an advanced Kinetic Warhead (KW). New component technologies include, but are not limited to: lightweight nosecone, advanced kinetic warhead, 21-inch second stage rocket motor, and 21-inch third stage rocket motor. The effort includes risk reduction for key components and supports EPAA Phase III.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604881C / <i>AEGIS SM-3 Block IIA Co-Development</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	106.038	9.739	0.000	-	0.000
Current President's Budget	102.272	9.739	0.000	-	0.000
Total Adjustments	-3.766	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.557	0.000			
• SBIR/STTR Transfer	-2.209	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

The increase in FY2018 from PB18 to PB19 provides Kinetic Warhead (KW) and Guidance Section (GS) qualification, required to complete SM-3 Block IIA Co-Development to meet EPAA Phase III time line.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MD09 / SM-3 Block IIA Co-Development
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD09: SM-3 Block IIA Co-Development	2,107.669	88.130	8.816	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2,204.615
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Note

Decrease in funding from FY2018 to FY2019 due to completion of the Kinetic Warhead and Guidance Section qualifications.

A. Mission Description and Budget Item Justification

The Scope of Work of the SCD project is defined in three phases:

Phase I took the program through System Design Review (SDR) in FY 2009. Aegis BMD executed risk reduction efforts for the Propulsion, Nosecone, Seeker, Divert Attitude Control System (DACS) development efforts, and test plans. Phase I Included requirements definition for the SM-3 Block IIA.

Phase II encompassed the work from SDR through the Critical Design Review (CDR) in FY 2014. Aegis BMD refined requirements and defined the performance allocation and component configuration for the development of the SM-3 Block IIA. The U.S. and Japan designed, fabricated, tested, and evaluated the SM-3 Block IIA sections per the agreed work-share agreement.

Phase III extends from CDR to the completion of the SCD flight test program as defined in the Agreement. This phase defines developmental cost share agreements between the United States and the Government of Japan, completes component engineering and integration, executes cooperative flight tests, and continues discussions on production and maintenance options. Phase III is planned to complete in FY 2018.

The SCD project will:

- Develop and integrate components for the SM-3 Block IIA into an All Up Round (AUR). Japan's work share includes 21 inch 2nd and 3rd stage components and the 21 inch nosecone. The U.S. work share includes the advanced kinetic warhead, advanced seeker, large diameter divert and attitude control system, and lightweight Vertical Launch System (VLS) canister.
- Integrate the SM-3 Block IIA VLS with Aegis Ship Systems.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: SM-3 Block IIA Cooperative Development (SCD)	88.130	8.816	0.000
Articles:	-	-	-
Description: This activity develops the SM-3 Block IIA which will increase the area that can be defended by Aegis Ballistic Missile Defense (BMD) and increase the probability of kill against a larger threat set. It will leverage enhanced capability provided by Ballistic Missile Defense System (BMDS) sensor upgrades.			
Recurring Accomplishments:			
- Prepare for and support BMDS Flight Test events as reflected in the IMTP and the Exhibit R-4 schedule			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MD09 / SM-3 Block IIA Co-Development

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- Develop and deliver lightweight VLS canisters in support of SCD testing events Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans: Decrease in funding from FY 2017 to FY 2018 due to completion of the Aegis SM-3 Block IIA Co-Development Program - Complete Kinetic Warhead (KW) and Guidance Section (GS) qualifications as required to complete Aegis SM-3 Block IIA Co-Development - Complete requirements verification of Japanese sections post qualification testing			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease in funding from FY 2018 to FY 2019 due to completion of the Aegis SM-3 Block IIA Co-Development Program.			
Accomplishments/Planned Programs Subtotals	88.130	8.816	0.000

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603884C: Ballistic Missile Defense Sensors	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: BMD Enabling Programs	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603892C: AEGIS BMD	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603896C: Ballistic Missile Defense Command and Control, Battle Management & Communication	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing

Remarks

D. Acquisition Strategy

The SM-3 Cooperative Development program for the SM-3 Block IIA missile utilizes a performance-based approach that ties program decision milestones to the performance of development prototypes, as well as Propulsion Test Vehicle and Controlled Test Vehicle flight test article performance. Acquisition of hardware, software modifications and required services will occur in conjunction with contractual and tasking efforts to U.S. Navy work and events, and as defined by signed agreements between the Governments of the United States and Japan.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / <i>AEGIS SM-3 Block IIA Co-Development</i>	Project (Number/Name) MD09 / <i>SM-3 Block IIA Co-Development</i>

E. Performance Metrics

SM-3 Block IIA Program Office is utilizing Incentive-based contracts to ensure project completes on time.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MD09 / SM-3 Block IIA Co-Development
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SM-3 Block IIA Cooperative Development (SCD) - SM-3 Block IIA Cooperative Development (SCD) - SM-3 BIK IIA Development - MD09	SS/CPAF	RAYTHEON : AZ	1,825.435	76.358	Nov 2016	8.816	Nov 2017	0.000		-		0.000	0.000	1,910.609	0.000
SM-3 Block IIA Cooperative Development (SCD) - SM-3 Block IIA Cooperative Development (SCD) - SM-3 BIK IIA Development and Canister - MD09. No longer funding in the FYDP	Various	Various : MD, VA, MA, CA, IN	282.234	11.772		0.000		0.000		-		0.000	0.000	294.006	0.000
Subtotal			2,107.669	88.130		8.816		0.000		-		0.000	0.000	2,204.615	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2,107.669	88.130	8.816	0.000	-	0.000	0.000	2,204.615	N/A

Remarks
Funding in the All Prior Years column represents a summary of Prior Years Total Costs for all contracts.

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency						Date: February 2018											
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development				Project (Number/Name) MD09 / SM-3 Block IIA Co-Development									
Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆	Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇								
MD09 SM-3 Block IIA Co-Development				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023	
				◇	◇	◇	◇	◇	◇	◇	◇						

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MD09 / SM-3 Block IIA Co-Development

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD09 SM-3 Block IIA Co-Development	1	2017	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MT09 / SM-3 Block IIA Co-Development Test
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT09: SM-3 Block IIA Co-Development Test	34.551	11.424	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	45.975
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

No funding needed.

A. Mission Description and Budget Item Justification

Working with the Services' Operational Test Agencies (OTA), with the support of the Director of Operational Test and Evaluation (DOT&E), MDA developed a test program to improve confidence in missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable.

The Integrated Master Test Plan (IMTP) is event-oriented and extends until the collection of all identified data is completed to ensure adequate test investments. MDA is focused on conducting meaningful ballistic missile testing that demonstrates the capabilities of the BMDS.

The MDA and the Japanese Ministry of Defense conduct the Standard Missile Cooperative Development (SCD) Project for the development and initial flight test of the SM-3 Block IIA in accordance with the jointly signed SCD Annex. The Joint signed SCD Program Schedule (dated October 2013) includes the following test events:

- * Restrained Firing - COMPLETE
- * Propulsion Test Vehicle - 1 (PTV-1) - Completed FY 2014
- * Controlled Test Vehicle - 1 (CTV-1) - Completed FY 2015
- * Controlled Test Vehicle - 2 (CTV-2) - Completed FY 2016
- * SCD Flight Test Standard Missile (FTM) - 1 (SFTM-01) - Planned for FY2017
- * SCD FTM - 2 (SFTM-02) - Planned for FY 2017

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: SM-3 Co-Development Flight Test Execution	11.424	0.000	0.000
Articles:	-	-	-
Description: This activity conducts ground and flight testing using the Aegis BMD 5.1 system to improve confidence in missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable.			
Recurring Accomplishments:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MT09 / SM-3 Block IIA Co-Development Test

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- Prepare for and conduct Ballistic Missile Defense System Flight and Ground Test events as reflected in the Integrated Master Test Plan and the Exhibit R-4 schedule. - Conduct Aegis BMD-specific analyses during pre and post-mission analysis phases.			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	11.424	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0604878C: <i>Aegis BMD Test</i>	131.012	137.783	95.756	-	95.756	80.684	94.138	146.910	137.601	Continuing	Continuing
• 0604880C: <i>Land Based SM-3 (LBSM3)</i>	40.452	30.486	27.692	-	27.692	29.263	28.370	27.228	28.225	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / <i>AEGIS SM-3 Block IIA Co-Development</i>	Project (Number/Name) MT09 / <i>SM-3 Block IIA Co-Development Test</i>

<u>E. Performance Metrics</u> N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MT09 / SM-3 Block IIA Co-Development Test
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SM-3 Co-Development Flight Test Execution - SM-3 Block IIA Cooperative Development (SCD) - SM-3 Blk IIA Development - MT09. No longer funding in the FYDP	Various	Various : AZ, CA, VA, MD, HI, MA, TX	34.551	11.424	Oct 2016	0.000		0.000		-		0.000	0.000	45.975	0.000
Subtotal			34.551	11.424		0.000		0.000		-		0.000	0.000	45.975	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	34.551	11.424	0.000	0.000	-	0.000	0.000	45.975	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MT09 / SM-3 Block IIA Co-Development Test
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆														
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 12.5%;">FY 2017</th> <th style="width: 12.5%;">FY 2018</th> <th style="width: 12.5%;">FY 2019</th> <th style="width: 12.5%;">FY 2020</th> <th style="width: 12.5%;">FY 2021</th> <th style="width: 12.5%;">FY 2022</th> <th style="width: 12.5%;">FY 2023</th> </tr> </thead> <tbody> <tr> <td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td><td>◇</td> </tr> </tbody> </table>					FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	◇	◇	◇	◇	◇	◇	◇
FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023												
◇	◇	◇	◇	◇	◇	◇												

IMTP v19.1 flight and ground test event details are at a higher classification.

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MT09 / SM-3 Block IIA Co-Development Test

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MD40 / Program-Wide Support
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: Program-Wide Support	73.205	2.718	0.923	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	76.846
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2017 and FY 2018, Program Wide Support reflects proportional changes as a result of a budget decrease and a FY 2019 elimination of the SM-3 Block IIA Co-Development program element.
 Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	2.718	0.923	0.000
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	2.718	0.923	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / <i>AEGIS SM-3 Block IIA Co-Development</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MD40 / Program-Wide Support
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	Allot	Various: Multi : ALess than CAless than COless than VA	6.549	0.045	Jul 2017	0.018	Jul 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Defense Manpower Data Center : AL,CA, CO, VA	0.009	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Service	C/CPFF	Various : Multi: AL, CA, CO, VA	11.258	2.673	Jul 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/Various	Various; Multi : AL, CO, VA	51.716	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance	MIPR	Various: Multi : AK, AL, CA, VA	3.673	0.000		0.905	Aug 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			73.205	2.718		0.923		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	73.205	2.718	0.923	0.000	-	0.000	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MD40 / Program-Wide Support
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆							
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇							
					FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
MD40 Program-Wide Support					◇◇◇◇	◇◇◇◇					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604881C / AEGIS SM-3 Block IIA Co-Development	Project (Number/Name) MD40 / Program-Wide Support

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	133.082	61.350	76.757	81.934	-	81.934	95.458	82.956	78.715	85.362	Continuing	Continuing
MT08: <i>Midcourse Test</i>	130.284	58.319	73.453	78.311	-	78.311	92.111	79.214	74.784	81.444	Continuing	Continuing
MD40: <i>Program Wide Support</i>	2.798	3.031	3.304	3.623	-	3.623	3.347	3.742	3.931	3.918	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Increase from FY 2018 to FY 2019 reflects Integrated Master Test Plan changes to include a new concept of Ground Testing (Continuous Development, Continuous Integration and Continuous Agile Testing (CIT/CAT)) which requires additional requirements of Test Planning, Test Integration, Test Execution and Analysis. Test activities that were previously performed sequentially will now be performed in parallel to reduce the test cycle time, with periods of 3 lab based activities simultaneously. These new sequential test flows will require additional test teams, off shift work to de-conflict assets and network infrastructure, and additional data packages and test reviews. Changes also include additional requirements of Test Planning, Test Integration, Test Execution and Analysis for new Cyber Security testing events. Using a new developmental crawl, walk, run Cyber test approach for each future GS build will require earlier and additional installation and checkout (2 to 3 early engineering releases and Pre-Formal Qualification releases) of the GS family of products in the labs to support earlier learning, feedback to the product development team, and final evaluation of cyber capability prior to operational cyber testing. Increased number of Target of Opportunity test events based on measured data due to the additional activity of real world events. In preparation for FTG-11 and CTV-03 additional test range telemetry and data collection upgrades are planned for Vandenberg Air Force Base, Pacific Missile Range Facility, and Point Mugu.

A. Mission Description and Budget Item Justification

Ballistic Missile Defense Midcourse Defense Segment Test provides flight and ground testing of Ground-based Midcourse Defense (GMD) functionality to demonstrate Enhanced Homeland Defense capabilities against long-range threats. The GMD components are tested in an integrated environment with Ballistic Missile Defense System (BMDS) sensors; Command & Control, Battle Management, Communications (C2BMC); Warfighters; and national collection assets to assess the ability to defend the United States and its territories against ballistic missile attack.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604887C I <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	56.481	76.757	74.205	-	74.205
Current President's Budget	61.350	76.757	81.934	-	81.934
Total Adjustments	4.869	0.000	7.729	-	7.729
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	6.300	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.431	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	7.729	-	7.729

Change Summary Explanation

Increase from PB 2018 to PB 2019 in FY 2019 reflects Integrated Master Test Plan changes to include a new concept of Ground Testing (Continuous Development, Continuous Integration and Continuous Agile Testing (CIT/CAT)) which requires additional requirements of Test Planning, Test Integration, Test Execution and Analysis. Test activities that were previously performed sequentially will now be performed in parallel to reduce the test cycle time, with periods of 3 lab based activities simultaneously. These new sequential test flows will require additional test teams, off shift work to de-conflict assets and network infrastructure, and additional data packages and test reviews. Changes also include additional requirements of Test Planning, Test Integration, Test Execution and Analysis for new Cyber Security testing events. Using a new developmental crawl, walk, run Cyber test approach for each future GS build will require earlier and additional installation and checkout (2 to 3 early engineering releases and Pre-Formal Qualification releases) of the GS family of products in the labs to support earlier learning, feedback to the product development team, and final evaluation of cyber capability prior to operational cyber testing. Increased number of Target of Opportunity test events based on measured data due to the additional activity of real world events. In preparation for FTG-11 and CTV-03 additional test range telemetry and data collection upgrades are planned for Vandenberg Air Force Base, Pacific Missile Range Facility, and Point Mugu.

PB19 reflects approved out year Missile Defeat and Defense Enhancement (MDDE) tails.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MT08 / <i>Midcourse Test</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MT08: <i>Midcourse Test</i>	130.284	58.319	73.453	78.311	-	78.311	92.111	79.214	74.784	81.444	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Ballistic Missile Defense Midcourse Defense Segment Test provides flight and ground testing of GMD functionality to demonstrate Enhanced Homeland Defense capabilities against long-range threats. The GMD components are tested in an integrated environment with BMDS sensors; C2BMC; Warfighters; and national collection assets to assess the ability to defend the United States and its territories against ballistic missile attack.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Resources	14.516	18.250	24.398
Articles:	-	-	-
<p>Description: Provides support associated with day-to-day operations of the flight and ground test programs to include engineering support for ground test planning, execution, and post-event reconstruction.</p> <p>Recurring work: provides test infrastructure and coordination of flight test range support from Vandenberg Air Force Base (VAFB), California, for all range activities, engineering, operators and GBI transportation; provides command and control and situational awareness for the GMD flight and ground test events at the MDA Integration and Operations Center (MDIOC) in Colorado Springs, Colorado and the Readiness and Control Facility (R&C) in Ft. Greely, Alaska; provides test communication plans, test communication control, satellite communication bandwidth, test network certification and accreditation for GMD flight and ground tests to integrate the range in Vandenberg Air Force Base, California, MDIOC in Colorado Springs, Colorado, Ft. Greely, Alaska and Pacific Missile Range Facility (PMRF) in Hawaii; provides engineering, operations and maintenance of the integrated system test labs in Huntsville, Alabama, to conduct BMDS flight test pre-mission risk reduction and system level ground testing for fielding warfighter capabilities that defend the homeland; provides operations and maintenance and equipment upgrades of the Prime Consolidated Integration Lab (PCIL) in Huntsville, Alabama to support flight test pre-mission risk reduction and post-flight reconstruction to provide confidence in models and simulations used for evaluation of performance of GMD homeland defense capabilities; and provides equipment upgrades at VAFB and the MDIOC to test support systems.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p>			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MT08 / <i>Midcourse Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>See above for recurring efforts.</p> <p>FY 2019 Plans: See above for recurring efforts.</p> <ul style="list-style-type: none"> -Support and execute a new BMDS test process and capability called Continuous Integration/Continuous Agile Testing(CI/CAT) to conduct system level integrated ground testing allowing more find and fix opportunities, and increased flexibility to meet agency additional Hard-Ware-In-the-Loop (HWIL) events -Support and execute Cyber Security Testing per DOT&E requirement for Cooperative Vulnerability and Penetration Assessment (CV PA) and Adversarial Assessment (AA) to support operational acceptance for BMDS weapon system fielding -Support and execute Target of Opportunity (TOO) testing at various locations per DOT&E requirement for data collection on TOO test events to support evaluation of performance of GMD homeland defense capabilities <p>FY 2018 to FY 2019 Increase/Decrease Statement: Increase from FY 2018 to FY 2019 reflects Integrated Master Test Plan changes to include a new concept of Ground Testing (Continuous Development, Continuous Integration and Continuous Agile Testing (CIT/CAT)) which requires additional requirements of Test Planning, Test Integration, Test Execution and Analysis. Test activities that were previously performed sequentially will now be performed in parallel to reduce the test cycle time, with periods of 3 lab based activities simultaneously. These new sequential test flows will require additional test teams, off shift work to de-conflict assets and network infrastructure, and additional data packages and test reviews. Changes also include additional requirements of Test Planning, Test Integration, Test Execution and Analysis for new Cyber Security testing events. Using a new developmental crawl, walk, run Cyber test approach for each future GS build will require earlier and additional installation and checkout (2 to 3 early engineering releases and Pre-Formal Qualification releases) of the GS family of products in the labs to support earlier learning, feedback to the product development team, and final evaluation of cyber capability prior to operational cyber testing. Increased number of Target of Opportunity test events based on measured data due to the additional activity of real world events. In preparation for FTG-11 and CTV-03 additional test range telemetry and data collection upgrades are planned for Vandenberg Air Force Base, Pacific Missile Range Facility, and Point Mugu.</p>			
<p>Title: Flight Test Execution</p> <p align="right">Articles:</p> <p>Description: Flight tests demonstrate the capabilities and/or phenomenology that cannot be adequately tested or obtained during ground testing. Flight tests also provide opportunities to test actual hardware and to demonstrate Ballistic Missile Defense System (BMDS) Element interoperability under operationally realistic conditions. Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p>	29.661 -	37.606 -	36.847 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MT08 / <i>Midcourse Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>Increase from FY 2017 to FY 2018 is due to the execution of FTG-11 and initial planning for CTV-03.</p> <p>-Conduct Flight Test Ground-based Midcourse Defense-11 (FTG-11), a 3-stage CE-II Block I and 3-stage CE-II Salvo intercept using GBIs launched from Vandenberg Air Force Base, California, against an ICBM target with associated objects, launched from Reagan Test Site (RTS) to test operational realism of the GMD salvo capability. Salvo intercept test requires additional resources from previous missions to support multiple interceptors: additional range support for mission execution and safety systems, silo refurbishment of two silos, additional data collectors, and additional post mission analyses</p> <p>-Initiate planning of range and data collection assets for Flight Test Ground-based Midcourse Defense-Controlled Test Vehicle-03 (GM CTV-03), a non-intercept mission with Redesigned Kill Vehicle (RKV) to collect RKV flight environment data using a GBI launched from Vandenberg Air Force Base, California</p> <p>FY 2019 Plans:</p> <p>-Conduct Flight Test Ground-based Midcourse Defense-11 (FTG-11), a 3-stage CE-II Block I and 3-stage CE-II Salvo intercept using GBIs launched from Vandenberg Air Force Base, California, against an ICBM target with associated objects, launched from Reagan Test Site (RTS) to test operational realism of the GMD salvo capability. Salvo intercept test requires additional resources from previous missions to support multiple interceptors: additional range support for mission execution and safety systems, silo refurbishment of two silos, additional data collectors, and additional post mission analyses</p> <p>-Initiate planning of range and data collection assets for Flight Test Ground-based Midcourse Defense-Controlled Test Vehicle-03 (GM CTV-03), a non-intercept mission with Redesigned Kill Vehicle (RKV) to collect RKV flight environment data using a GBI launched from Vandenberg Air Force Base, California</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>			
<p>Title: Ground Test Execution</p> <p align="right">Articles:</p> <p>Description: Ground tests demonstrate and validate Warfighter tactics, techniques, and procedures. Ground tests are executed both in the Hardware-in-the-loop (HWIL) lab and in the field. HWIL lab tests integrate and assess Ballistic Missile Defense System (BMDS) system- level performance based on new element capabilities. Ground tests in the field use existing fielded element assets and tactical communication networks, to integrate, assess and demonstrate the element capabilities.</p> <p>FY 2018 Plans:</p> <p>-Support execution of GT-07b Early Integration to assess BMDS capabilities and the mission functionality of the GMD GS version 7B BMDS capabilities for Robust Homeland Defense performance</p>	4.862 -	4.550 -	7.196 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MT08 / <i>Midcourse Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p>-Support execution of GTI-07b and continue to support planning and integration of GTD-07b Part 2 to assess BMDS capabilities and the mission functionality of the GMD GS version 7B BMDS capabilities for Future Sensor Utilization and GS Technology Refresh</p> <p>FY 2019 Plans:</p> <p>-Support execution of GTI-07b and GTD-07b Part 2 to assess BMDS capabilities and the mission functionality of the GMD GS version 7A BMDS capabilities for Future Sensor Utilization and GS Technology Refresh</p> <p>-Support planning and integration of Warfighter TP 07b, 14-day Trial Period following the GTD-07b, to allow the new software to soak on the operational system ensuring that there are no degrading effects or anomalies that were not identified in previous testing.</p> <p>-Support planning, integration and execution of GTI-07c (NORTHCOM/PACOM) (N/P) and early planning of GTD-07c (N/P) to support fielding of the GMD Increment 6B capability.</p> <p>-Support planning of GTI-08 to assess BMDS-level interoperability with maturing Element capabilities, asset allocations, and geographical content (C2BMC S8.2-5, BOA 7.1, AN/TPY-2 (FBM) CX 4.0.0, GS 8, and THAAD 4.0.0)</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement:</p> <p>Increase from FY 2018 to FY 2019 reflects execution of the GT-07 Ground Test Campaign and addition of GTI-07c ground test to collect the data required for fielding GS-7b including the GCN Modernization.</p>			
<p>Title: Program Operations</p> <p align="right">Articles:</p> <p>Description: Program Operations provides for government management of the Ground-based Midcourse Defense (GMD) Test program. This effort includes program and business management support activities, financial management, cost and schedule performance analyses, cost estimation and analyses, configuration management, and integration. It also includes activities to provide critical program status and decision quality data and GMD test program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process and technical and testing oversight, quality/safety/mission assurance, integrated logistics support, and government manpower and infrastructure to test the GMD system and components.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <p>- SEE ABOVE.</p> <p>FY 2019 Plans:</p>	9.280 -	13.047 -	9.870 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MT08 / <i>Midcourse Test</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
- SEE ABOVE.			
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease from FY 2018 to FY 2019 reflects return to sufficient levels of staffing after re-baselining change in acquisition strategy.			
Accomplishments/Planned Programs Subtotals	58.319	73.453	78.311

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0203882C: MD08: GMD O&M	129.281	137.896	143.027	-	143.027	139.319	142.269	145.188	0.000	Continuing	Continuing
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing
• 0604874C: <i>Improved Homeland Defense (HLD) Interceptors</i>	247.362	636.430	561.220	-	561.220	485.755	502.023	604.309	635.719	Continuing	Continuing

Remarks

D. Acquisition Strategy

The GMD program will continue to follow testing, development, and evolutionary acquisition through incremental development. The Agency acquisition strategy ensures that the GMD components are upgraded to improve both system performance and interceptor reliability in order to retain the proven GMD contribution to the BMDS. This acquisition approach minimizes the risk of parts availability, provides opportunities for incremental capability improvements, and allows decision makers to make informed trades between cost, schedule, and performance while exploring improved operational and technological capabilities.

GMD awarded a competitive Development and Sustainment Contract (DSC) on December 30, 2011. This contract continues development, fielding, test, systems engineering, integration, and configuration management; equipment manufacturing and upgrade; training, operations and sustainment of the GMD system and associated support facilities. The DSC emphasizes the application of performance-based tenets to provide timely high quality support of the core GMD system while reducing life cycle and long-term ownership costs. GMD's acquisition strategy for transition of the legacy content into the DSC provides uninterrupted field operations; development of both Ground Systems and Interceptor (GBI) products, including manufacturing additional interceptors to support both operations and testing; and the requirement to demonstrate war fighting capability through a rigorous ground and flight test program.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
0400 / 4	PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	MT08 / <i>Midcourse Test</i>

In January of 2018 the MDA Director signed an Acquisition Strategy Decision Memorandum (ASDM) changing the acquisition strategy to execute the Missile Defeat and Defense Enhancement scope. The Development and Sustainment Contract (DSC) will continue with the Boeing Company to Q1 FY2024 to build the 20 GBI's and 20 Silo's with supporting test, engineering, software, and performance based logistics scope. This additional capability will provide 64 interceptors by the end of calendar year 2023 as well as maintain operation and support capabilities and support upcoming ground and flight tests. The Justification and Approval for this action was signed by the MDA Director on 2 January 2018.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MT08 / <i>Midcourse Test</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Operations - Contract Support Services	C/CPFF	Various AL/AK/ : CA/ CO/VA	0.000	5.000	Oct 2016	6.942	Oct 2017	4.536	Oct 2018	-		4.536	Continuing	Continuing	Continuing
Program Operations - Government Civilian Salaries	MIPR	MDA AL/ : VA	0.000	4.280	Oct 2016	6.105	Oct 2017	5.334	Oct 2018	-		5.334	Continuing	Continuing	Continuing
Program Operations - Range, Resources, and Engineering	C/CPAF	Various : AL/AK/CA/ CO/VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.000	9.280		13.047		9.870		-		9.870	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Resources - Cyber Security - Simulation Center	MIPR	Space and Missile Systems Center (SMDC) : AL	0.009	0.000		0.000		0.000		-		0.000	0.000	0.009	0.000
Resources - Cyber Security - Advanced Research Center Cyber Support	C/IDIQ	COLSA Corp : AL	4.162	0.000		0.000		0.000		-		0.000	0.000	4.162	0.000
Resources - Cyber Security - NSITE/GT Communications	MIPR	Aviation & Missile Research & Development : AL	0.138	0.000		0.000		0.000		-		0.000	0.000	0.138	0.000
Resources - Cyber Win10 Implementation - MDDC Lab Analysis Infrastructure	C/IDIQ	Analytical Services, In. : AI	1.449	0.000		0.000		0.000		-		0.000	0.000	1.449	0.000
Resources - Engineering & Analysis - Industry Support	C/CPAF	Boeing : AL	4.221	0.000		0.000		0.000		-		0.000	0.000	4.221	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MT08 / <i>Midcourse Test</i>
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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Resources - Engineering & Analysis - OGA Support	MIPR	AMRDEC : AL	4.098	0.000		0.000		0.000		-		0.000	0.000	4.098	0.000
Resources - Government Infrastructure Support, Labs, and Communications	MIPR	VAFB : CA/AL/CO	11.495	6.408	Nov 2016	9.901	Nov 2017	17.568	Nov 2018	-		17.568	Continuing	Continuing	Continuing
Resources - Prime Infrastructure Support, Labs, and Communications	C/CPAF	Boeing : AL/AK/AZ/CA/CO/OR/TX/VA	13.831	8.108	Nov 2016	8.349	Nov 2017	6.830	Nov 2018	-		6.830	Continuing	Continuing	Continuing
Flight Test Execution - Planning and Silo Refurbishment	C/CPAF	Boeing : AL/AK/AZ/CA/CO/OR/TX/VA	50.459	18.965	Nov 2016	8.180	Nov 2017	13.254	Nov 2018	-		13.254	Continuing	Continuing	Continuing
Flight Test Execution - Range, Resources, and Engineering	MIPR	VAFB/PMRF : CA/HI	28.110	10.696	Nov 2016	29.426	Nov 2017	23.593	Nov 2018	-		23.593	Continuing	Continuing	Continuing
Ground Test Execution - Ground Test-04 Campaign	C/CPAF	Boeing : AL/AK/AZ/CA/CO/TX/VA	3.355	0.000		0.000		0.000		-		0.000	0.000	3.355	0.000
Ground Test Execution - Ground Test-06 Campaign	C/CPAF	Boeing : AL/AK/AZ/CA/CO/TX/VA	8.163	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ground Test Execution - Ground Test-07 Campaign	C/CPAF	Boeing : AL/AK/AZ/CA/CO/TX/VA	0.794	4.862	Nov 2016	4.459	Nov 2017	7.196	Nov 2018	-		7.196	Continuing	Continuing	Continuing
Ground Test Execution - Ground Test-08 Campaign	C/CPAF	Boeing : AL/AK/AZ/CA/CO/TX/VA	0.000	0.000		0.091	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			130.284	49.039		60.406		68.441		-		68.441	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	130.284	58.319	73.453	78.311	-	78.311	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency							Date: February 2018			
Appropriation/Budget Activity 0400 / 4			R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>			Project (Number/Name) MT08 / <i>Midcourse Test</i>				
	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	

Remarks N/A									
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MT08 / <i>Midcourse Test</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇

	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
IMTP v19.1 flight and ground test event details are at a higher classification.	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MT08 / <i>Midcourse Test</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
IMTP v19.1 flight and ground test event details are at a higher classification.	1	2017	4	2023

Note

Notes: CTV - Controlled Test Vehicle; GTI - Ground Test Integrated; GTD - Ground Test Distributed; GTX - Ground Test Exercise; GDEx - Global Defender Exercise; FTG - Flight Test Ground-Based Interceptor; FTO - Flight Test Operational; FTX - Flight Test Exercise; N/P - NORTHCOM/PACOM

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program Wide Support</i>	2.798	3.031	3.304	3.623	-	3.623	3.347	3.742	3.931	3.918	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) reflects proportional changes as a result of budget changes to the Missile Defense Midcourse Defense Segment Test program element. Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests on the R-3.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	3.031	3.304	3.623
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	3.031	3.304	3.623

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations User Services	Reqn	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.870	Aug 2018	1.987	Jun 2019	-		1.987	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : MDA Multi: AL, CO, CA	2.798	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi: AL, VA	0.000	0.000		0.016	Aug 2018	0.016	Aug 2019	-		0.016	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	0.000	3.031	Aug 2017	2.103	Aug 2018	0.661	Jul 2019	-		0.661	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness (MIPRs)	MIPR	Naval Surface Warfare Center : VA, AL	0.000	0.000		0.249	Aug 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA	0.000	0.000		0.066	Jun 2018	0.319	Jul 2019	-		0.319	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	Various : Multi: AL, VA	0.000	0.000		0.000		0.640	Aug 2019	-		0.640	Continuing	Continuing	Continuing
Subtotal			2.798	3.031		3.304		3.623		-		3.623	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.798	3.031	3.304	3.623	-	3.623	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency							Date: February 2018			
Appropriation/Budget Activity 0400 / 4			R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>			Project (Number/Name) MD40 / <i>Program Wide Support</i>				
	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	

Remarks N/A									
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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
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	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604887C / <i>Ballistic Missile Defense Midcourse Defense Segment Test</i>	Project (Number/Name) MD40 / <i>Program Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	6.500	8.256	-	8.256	33.935	8.277	184.118	355.060	0.000	596.146
MD85: <i>Multi Object Kill Vehicle</i>	-	0.000	6.500	7.886	-	7.886	32.463	7.904	175.545	338.971	0.000	569.269
MD40: <i>Program-Wide Support</i>	-	0.000	0.000	0.370	-	0.370	1.472	0.373	8.573	16.089	0.000	26.877

Program MDAP/MAIS Code: 362

Note

Increase from FY 2018 to FY 2019 reflects an increase in personnel required to conduct market research, continue requirements development, continue development of an initial modeling and simulation capability and continue development of an overall acquisition strategy for competitive development, engineering, test, manufacture, and production for the MOKV.

A. Mission Description and Budget Item Justification

The Multi-Object Kill Vehicle (MOKV) program will enhance Ground-Based Midcourse Defense (GMD) Interceptor performance to enable the Warfighter to counter more numerous and complex threats to the Homeland by enabling engagement of multiple objects from a single interceptor. The Missile Defense Agency (MDA) is developing the concepts for a MOKV based on a modular, open systems architecture designed to common interfaces and standards, making upgrades easier and broadening MDA's vendor and supplier base.

The MOKV will rely on a BMDS architecture that balances performance across the Sensors, Command, Control, Battle Management and Communications (C2BMC), and GMD elements. Analyses show that having multiple kill vehicles on each interceptor can dramatically improve the performance of the system, significantly reduce the burden on interceptor inventory, and reduce cost to defend the Homeland.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	71.513	6.500	3.500	-	3.500
Current President's Budget	0.000	6.500	8.256	-	8.256
Total Adjustments	-71.513	0.000	4.756	-	4.756
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	-71.513	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	4.756	-	4.756

Change Summary Explanation

The increase from PB18 to PB19 in FY 2019 reflects an increase in personnel required to conduct market research, continue requirements development, continue development of an initial modeling and simulation capability and continue development of an overall acquisition strategy for competitive development, engineering, test, manufacture, and production for the MOKV.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>				Project (Number/Name) MD85 / <i>Multi Object Kill Vehicle</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD85: <i>Multi Object Kill Vehicle</i>	-	0.000	6.500	7.886	-	7.886	32.463	7.904	175.545	338.971	0.000	569.269
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The increase from FY2018 to FY2019 reflects an increase in personnel required to conduct market research, continue requirements development, continue development of an initial modeling and simulation capability and continue development of an overall acquisition strategy for competitive development, engineering, test, manufacture, and production for the MOKV.

A. Mission Description and Budget Item Justification

The Ground-based Midcourse Defense (GMD) element of the Ballistic Missile Defense System (BMDS) provides combatant commanders with a continuously available (24 hours a day, 365 days a year) capability to defend the United States Homeland against Intercontinental Ballistic Missile (ICBM) attacks. In order to address the evolving and expanding threat of ballistic missile attacks on the Homeland, MDA is developing a more capable ground-based interceptor with a Multi-Object Kill Vehicle (MOKV) that will be able to defeat complex future threats.

MDA will develop an MOKV that is:

- Effective, with the weapon payload able to use on-board and off-board data to acquire, track, select, engage and negate the threats
- Capable, enabling protection of the defended area with sufficient battlespace to meet the warfighter needs
- Enduring, available and reliable over a long service life
- Resilient, with graceful degradation, and survivable in natural and man-made wartime environments
- Compatible and fully integrated as a component of the BMDS, optimized to perform within the baseline BMDS architecture
- Modular, supporting open architecture and standards to enable efficient upgrades and sustainment
- Evolvable to future architecture expansion and modifications

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Multi-Object Kill Vehicle	0.000	6.500	7.886
Articles:	-	-	-
Description: In order to address the evolving and expanding threat of ballistic missile attacks on the Homeland, MDA is developing a more capable ground-based interceptor with a Multi-Object Kill Vehicle (MOKV) that will be able to defeat complex future threats.			
The MOKV replaces a unitary kill vehicle (KV) on current GBIs with a payload containing multiple, smaller kill vehicles (KVs). The MOKV concept also allows for a potentially substantial reduction of the GBI inventory required to protect the homeland, as multiple GBIs with a unitary KV will no longer be required to address a target complex with multiple threats.			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>	Project (Number/Name) MD85 / <i>Multi Object Kill Vehicle</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Specific and/or unique accomplishments to each FY are as follows:			
<i>FY 2018 Plans:</i> - Conduct market research to shape acquisition strategy - Develop an acquisition strategy for competitive development, engineering, test, manufacture, and production for the MOKV - Establish initial modeling and simulation capability to support MOKV project decisions - Initiate contract requirements development			
<i>FY 2019 Plans:</i> - Continue market research to shape acquisition strategy - Continue to develop an acquisition strategy for competitive development, engineering, test, manufacture, and production for the MOKV - Continue initial modeling and simulation capability to support MOKV project decisions - Continue contract requirements development			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> Increase from FY 2018 to FY 2019 reflects an increase in personnel required to conduct market research, continue requirements development, continue development of an initial modeling and simulation capability and continue development of an overall acquisition strategy for competitive development, engineering, test, manufacture, and production for the MOKV.			
Accomplishments/Planned Programs Subtotals	0.000	6.500	7.886

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u> <u>Base</u>	<u>FY 2019</u> <u>OCO</u>	<u>FY 2019</u> <u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• 0603294C: <i>Common Kill Vehicle Technology</i>	54.395	252.879	189.753	-	189.753	205.645	254.130	122.494	52.373	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy will support transition of Multi Object Kill Vehicle (MOKV) from risk reduction activities into a full development effort as an integrated part of the Ground-based Midcourse Defense Element. The MOKV project will follow a pre-planned product improvement strategy and use modular open architectures to allow MDA to incorporate advanced technologies into the design once the technologies are sufficiently mature. MDA will use proven analysis and testing techniques to independently verify contractor designs against the defined system performance specifications and standards prior to production.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>	Project (Number/Name) MD85 / <i>Multi Object Kill Vehicle</i>
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E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / Multi Object Kill Vehicle	Project (Number/Name) MD85 / Multi Object Kill Vehicle
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Multi-Object Kill Vehicle - Inertial Measurement Unit Development	C/CPFF	Kearfott : NJ	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Multi-Object Kill Vehicle - MOKV Technology Risk Reduction	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks
N/A

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Multi-Object Kill Vehicle - Contract Support Services	C/CPFF	Various : AL/AK/CA/CO/VA	0.000	0.000		2.750	Nov 2017	5.173	Nov 2018	-		5.173	Continuing	Continuing	Continuing
Multi-Object Kill Vehicle - FFRDC Support Services	MIPR	Various : Various	0.000	0.000		1.427	Nov 2017	0.318	Nov 2018	-		0.318	Continuing	Continuing	Continuing
Multi-Object Kill Vehicle - MOKV Development	C/CPFF	Various : AL/AK/CA/CO/VA	0.000	0.000		0.095	Jan 2018	0.000		-		0.000	Continuing	Continuing	Continuing
Multi-Object Kill Vehicle - Other Government Agencies	MIPR	Various : Various	0.000	0.000		2.081	Nov 2017	2.395	Nov 2018	-		2.395	Continuing	Continuing	Continuing
Multi-Object Kill Vehicle - Small Business Innovation Research	MIPR	Various : Various	0.000	0.000		0.147		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		6.500		7.886		-		7.886	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>	Project (Number/Name) MD85 / <i>Multi Object Kill Vehicle</i>
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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	6.500	7.886	-	7.886	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>	Project (Number/Name) MD85 / <i>Multi Object Kill Vehicle</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇

	FY 2017			FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
MOKV Development Acquisition Strategy				◇	◇	◇	◇	◇	◇	◇	◇																				
MOKV Development												◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>	Project (Number/Name) MD85 / <i>Multi Object Kill Vehicle</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MOKV Development Acquisition Strategy	1	2018	4	2019
MOKV Development	1	2020	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0604894C / Multi Object Kill Vehicle				Project (Number/Name) MD40 / Program-Wide Support			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: Program-Wide Support	-	0.000	0.000	0.370	-	0.370	1.472	0.373	8.573	16.089	0.000	26.877
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning FY 2019, Program Wide Support (PWS) was proportionately allocated to Multi Object Kill Vehicle. FY 2019 and out reflects proportional changes as a result of budget changes to the Multi Object Kill Vehicle program element.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs, including Government Civilians and Contract Support Services , in support of MDA functions and activities across the entire BMDS. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation and, provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	0.000	0.000	0.370
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	0.000	0.000	0.370

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.000		0.370	Jul 2019	-		0.370	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AK, AL, CA, CO, HI, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi: AK, AL, CA, CO, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		0.370		-		0.370	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	0.000	0.370	-	0.370	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
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	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MD40 Program-Wide Support	◇	◇	◇	◇	◇	◇	◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604894C / <i>Multi Object Kill Vehicle</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0305103C / <i>Cyber Security Initiative</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	2.797	0.945	0.986	0.985	-	0.985	1.140	1.163	1.187	1.209	Continuing	Continuing
MDCS: <i>Cyber Security Initiative</i>	2.797	0.945	0.986	0.985	-	0.985	1.140	1.163	1.187	1.209	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

The MDA Counterintelligence (CI) Division conducts CI in Cyberspace activities pursuant to DoD Directive DoDD 5240.02 (Counterintelligence) and DoD Instruction S-5240.23 (CI Activities in Cyberspace) to identify, disrupt, neutralize, penetrate, and exploit foreign intelligence services and international terrorist organizations, hereafter referred to as foreign entities, to act in observable or exploitable ways. To this end, the MDA CI Division conducts activities to detect and neutralize foreign entity-directed malicious and insider threat activities targeting MDA administrative and Ballistic Missile Defense fire control networks and mobile devices.

B. Program Change Summary (\$ in Millions)

	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>
Previous President's Budget	0.969	0.986	0.997	-	0.997
Current President's Budget	0.945	0.986	0.985	-	0.985
Total Adjustments	-0.024	0.000	-0.012	-	-0.012
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.024	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-0.012	-	-0.012

Change Summary Explanation

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0305103C / <i>Cyber Security Initiative</i>				Project (Number/Name) MDCS / <i>Cyber Security Initiative</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MDCS: <i>Cyber Security Initiative</i>	2.797	0.945	0.986	0.985	-	0.985	1.140	1.163	1.187	1.209	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The DoD Counterintelligence in Cyberspace (CIC) mission initiative is externally funded and falls under the functional and fiscal management of the Director, Defense Intelligence Agency. The MDA Counterintelligence (CI) Division conducts defensive CIC activities pursuant to DoD Directive DoDD 5240.02 (Counterintelligence), DoD Instruction S-5240.23 (CI Activities in Cyberspace) and DoD Instruction 5240.26 (Countering Espionage, International Terrorism, and the CI Insider Threat), and an MDA Annex within an annual DIA-approved Implementation Plan.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: DoD CI in Cyberspace Initiative	0.945	0.986	0.985
Articles:	-	-	-
<p>Description: This activity detects, identifies and neutralizes malicious activities directed by foreign entities that target MDA cyber assets. The following actions are required on a continuing basis to accomplish the DoD CI in Cyberspace Initiative:</p> <ul style="list-style-type: none"> -- Collaborate with the MDA Computer Emergency Response Team (CERT) to detect and neutralize potential foreign entity directed malicious and insider threat activities targeting MDA administrative and fire control networks, and mobility devices. -- Conduct CI Preliminary Inquiries into potential foreign entity directed malicious or insider threat activities and refers suspected incidents or events to the FBI or military department CI organizations for further investigation. -- Conduct CI forensics analysis of MDA computer network activity logs to identify potential indicators of foreign entity directed malicious, insider threat or computer network attack/exploitation activities targeting MDA information. -- Coordinate with national and DoD level intelligence, CI and law enforcement agencies to identify foreign entity cyber actor intrusion sets and the tactics, techniques and procedures used to target MDA and its Cleared Defense Contractor computer networks. -- Coordinate with MDA cleared defense contractors that have been compromised by foreign intelligence entities to capture and triage exfiltrated MDA related data, allowing BMDS engineering teams to perform proper damage assessments. -- Provide required initial and periodic training to ensure the MDA workforce is kept apprised of foreign entity threats to DoD personnel, facilities, information, activities, and information technology systems. -- Protect MDA SCIF/SAP areas from cellular/wireless device monitoring. -- Provide support to the MDA Insider Threat program. <p>Specific and/or unique accomplishments to each FY are as follows:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0305103C / <i>Cyber Security Initiative</i>	Project (Number/Name) MDCS / <i>Cyber Security Initiative</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<i>FY 2018 Plans:</i> - SEE ABOVE.			
<i>FY 2019 Plans:</i> - SEE ABOVE.			
<i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> N/A			
Accomplishments/Planned Programs Subtotals	0.945	0.986	0.985

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing

Remarks

D. Acquisition Strategy

This project leverages expertise in the intelligence community, counterintelligence community, and information assurance community, including the Military Services, Federally Funded Research and Development Centers (FFRDCs), University affiliated Research Centers (UARCs), and industry.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0305103C / <i>Cyber Security Initiative</i>	Project (Number/Name) MDCS / <i>Cyber Security Initiative</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DoD CI in Cyberspace Initiative - CI in Cyberspace	Allot	MDA : VA	0.328	0.170	Oct 2016	0.166	Oct 2017	0.160	Oct 2018	-		0.160	Continuing	Continuing	Continuing
DoD CI in Cyberspace Initiative - Counterintelligence	C/CPFF	TEAMS : VA, AL	1.775	0.775	Nov 2016	0.720	Nov 2017	0.732	Nov 2018	-		0.732	Continuing	Continuing	Continuing
DoD CI in Cyberspace Initiative - Technical Surveillance & Countermeasures	MIPR	USA-TAO : Ft. Detrick, MD	0.694	0.000		0.100	Nov 2017	0.093	Nov 2018	-		0.093	Continuing	Continuing	Continuing
Subtotal			2.797	0.945		0.986		0.985		-		0.985	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.797	0.945	0.986	0.985	-	0.985	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0305103C / <i>Cyber Security Initiative</i>	Project (Number/Name) MDCS / <i>Cyber Security Initiative</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023							
MDCS Cyber Security Initiative	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0305103C / <i>Cyber Security Initiative</i>	Project (Number/Name) MDCS / <i>Cyber Security Initiative</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MDCS Cyber Security Initiative	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	34.907	36.955	-	36.955	37.134	35.617	36.404	37.503	Continuing	Continuing
MD12: <i>Space Tracking and Surveillance System (STSS)</i>	-	0.000	32.015	32.217	-	32.217	34.154	33.671	34.363	35.356	Continuing	Continuing
MC12: <i>Cyber Operations</i>	-	0.000	1.336	2.997	-	2.997	1.359	0.340	0.340	0.446	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	-	0.000	1.556	1.741	-	1.741	1.621	1.606	1.701	1.701	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603893C is transferred to PE 1206893C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security.

A. Mission Description and Budget Item Justification

The two Space Tracking and Surveillance System (STSS) satellites launched in 2009 provide an on-orbit capability to validate remote sensor fire control integration to inform design and operation of future Missile Defense Agency (MDA) space-layer capabilities. MDA uses STSS data to characterize contribution of space data into the Ballistic Missile Defense System (BMDS) and to provide sensor measurements and background data supporting trade studies and analyses for future MDA space-layer options for both Homeland and Regional Defense.

STSS continues to provide risk reduction for future MDA space capabilities, models, algorithms, interface definitions, communications architectures, and performance across threat object acquisition, tracking, complex target signatures, discrimination and multi-mission support. STSS also informs the Ballistic Missile Defense System (BMDS) Concept of Operations, timelines and performance requirements for remote space sensor cuing for ballistic missile engagements, expanding battle space for weapon systems such as Aegis Ballistic Missile Defense (BMD).

The STSS program demonstrates the functions and interfaces required for space data delivery to the BMDS, validating the data quality necessary for interceptors to launch and/or engage on STSS sensor data. The two STSS satellites are operated from the ground station processing center at the Missile Defense Space Center (MDSC). The STSS satellites demonstrate MDA space-layer capabilities and reduce risk for future systems by viewing high-value Targets of Opportunity and participating in BMDS flight tests.

The MDSC provides MDA's only centralized collaboration and integration environment that leverages existing Overhead Persistent Infrared (OPIR) enterprise integration in support of BMDS research and development test, and sensor operations. The MDSC capabilities and infrastructure support flight tests, operational concept and prototype development, technology demonstrations, experiments, and algorithm development within a multi-security, collaborative environment to integrate and exploit

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>
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national space asset data. The MDSC also conducts studies and experiments with MDA assets such as the Spacebased Kill Assessment (SKA), and STSS, as well as other agencies' assets.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	34.907	39.453	-	39.453
Current President's Budget	0.000	34.907	36.955	-	36.955
Total Adjustments	0.000	0.000	-2.498	-	-2.498
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-2.498	-	-2.498

Change Summary Explanation

Decrease in FY 2019 of \$2.498 million reflects a realignment to PE 0603890C, MC30, for Cyber initiatives as well as other Department of Defense priorities.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>				Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD12: <i>Space Tracking and Surveillance System (STSS)</i>	-	0.000	32.015	32.217	-	32.217	34.154	33.671	34.363	35.356	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603893C is transferred to PE 1206893C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security.

A. Mission Description and Budget Item Justification

Two Space Tracking and Surveillance System (STSS) satellites provide a low earth orbit sensor capability with visible and infrared sensors for integrated testing with other Ballistic Missile Defense System (BMDS) elements. STSS demonstrates space-based capabilities including persistent tracking and integrated BMDS discrimination improvements. These two satellites provide valuable risk reduction for acquisition, tracking, complex scenes, and discrimination functionality to include stereo data fusion, cueing radars over the horizon and over-the-horizon fire control.

The on-orbit sensors collect invaluable background, scene and target signatures to support future MDA space-layer and other weapon sensor development trade studies. STSS activities provide information for integration of space-based missile tracking (midcourse phase); remote sensor and weapons cueing via the Command and Control, Battle Management and Communications (C2BMC); features and discrimination; and hit/impact point assessments. STSS enables early capability assessment to address the Warfighter's need for highly available early missile tracking from space, providing an operationally suitable means of global persistent surveillance and engagement. Capabilities being assessed for future MDA space-layer capabilities include detecting and acquiring ballistic missiles; tracking ballistic missiles and their deployed objects; performing autonomous acquisition-to-track handover within a satellite; performing tracking handover to a satellite from a ground cue; performing uplink and downlink of mission, health, and status data both directly and via crosslink between two satellites; reporting ballistic missile and intercept event to close the fire-control loop; filtering reports to C2BMC; and providing near real-time object data to external users. STSS support to other mission areas improves definition for future Enterprise system approaches.

The Missile Defense Space Center (MDSC) provides capabilities and infrastructure to support space operations, integration and testing with the BMDS. It provides a multi-level security environment for sensor data management and integration across space and terrestrial sensor data activities. MDSC experiments leverage DoD and national security space capabilities. MDSC activities support analyses, demonstration and integration of space sensor capabilities into developmental and operational MDA elements. MDSC enables the development of advanced technology and algorithms including fusion of multiple sensor types (radar, overhead persistent infrared, electro-optical and other emerging sensor technologies). It also supports mission integration of space-based missile tracking, sensor and weapons cueing via C2BMC, features and discrimination, kill and impact point assessments into the BMDS and other non-MDA mission areas, including Space Situational Awareness, technical intelligence, and battle space characterization. This effort is a continuation of work previously performed in program element 0603895C that supported the STSS program.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

Lessons learned and data gathered from the STSS demonstration satellites program provide valuable information for future MDA space-layer modeling and simulation activities in assessing the capability provided by Overhead Persistent Infrared sensors.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>Title: Demonstration Satellites</p> <p align="right">Articles:</p> <p>Description: The STSS demonstration satellites collect and deliver critical space and missile characterization data used to design and inform the BMDS and space-layer future capabilities. The MDSC facilities and activities are required for safe STSS satellite operations and sustainment STSS activities include:</p> <ul style="list-style-type: none"> - Perform risk reduction for future MDA tracking and surveillance initiatives and OPIR Enterprise integration and demonstrations across OPIR cueing, Joint Tasking Operations, and data utility - Collect data to support joint OPIR mission utility assessments across Space Situational Awareness, Battle Space Awareness, and Technical Intelligence missions to include integration, analyses, and studies to confirm data sharing capabilities - Participate in Integrated Master Test Plan events - Conduct satellite testing to demonstrate critical space capabilities, including: <ul style="list-style-type: none"> -- Ability to support BMDS integrated discrimination efforts -- Ability to support Hit/Kill assessment from space -- Ability to cue BMDS sensors from space -- Ability to provide precision cue to BMDS sensors - Perform satellite functionality testing and calibration as part of the satellite operations - Conduct missile tracking experiments as identified in the test specific sections - Provide Air Force Space Command Space Situational Awareness support <p>MDSC efforts related to STSS include:</p> <ul style="list-style-type: none"> - Analyze space radiation environment and its influence on MDA space system performance - Analyze space based sensor data from STSS and OPIR observations, both individually and combined, to identify phenomenology and techniques to aid future tracking and discrimination architectures - Provide data for concept studies and analyses for alternative sensor payload configurations - Sustain MDSC resources for all participant activities, including data, voice, and/or video communications, and support MDA Cyber Security directives - Document requirements and perform tracking, design, implementation, and verification necessary for the MDSC facility - Implement emerging cyber security requirements 	0.000	32.015	32.217
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
Specific and/or unique accomplishments to each FY are as follows:			
FY 2018 Plans: - SEE ABOVE.			
FY 2019 Plans: - SEE ABOVE.			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	0.000	32.015	32.217

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603890C: <i>BMD Enabling Programs</i>	435.203	465.642	540.926	-	540.926	542.326	608.210	489.637	496.313	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	Cost To	
			Base	OCO	Total					Complete	Total Cost
• 1206895C: <i>Ballistic Missile Defense System Space Programs</i>	0.000	30.994	16.484	-	16.484	19.555	19.097	17.888	18.236	Continuing	Continuing

Remarks

D. Acquisition Strategy

The STSS demonstration satellites program follows MDAs capability-based acquisition strategy that emphasizes testing, incremental development, and evolutionary acquisition. The STSS effort utilizes a single prime contractor, Northrop Grumman Aerospace Systems (NGAS) with the subcontractor Raytheon providing the sensor payload. This contract implements MDA's capability-based acquisition strategy by using existing satellite hardware as a low risk opportunity, building upon the lessons learned from previous development efforts, and establishing a series of planned enhancements to bring added capability to the BMDS.

MDSC efforts will be acquired on the Integrated Research and Development for Enterprise Solutions contract vehicle. This contract is responsible for integrating Research, Development, Test and Evaluation, operations support, resource and infrastructure management for the MDSC. Through various uses of incentives upon the requirement objectives, the contractor provides customer support while striving to achieve efficiencies through approaches that meet or exceed customer requirements.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Demonstration Satellites - Capability Based R&D	SS/CPAF	NGAS : Redondo Beach, CA, Schriever AFB, CO	0.000	0.000		20.066	Nov 2017	20.279	Nov 2018	-		20.279	Continuing	Continuing	Continuing
Demonstration Satellites - STSS Support to Missile Defense Space Center (MDSC)	C/TBD	TBD : Schriever AFB, CO	0.000	0.000		3.893	Nov 2017	3.733	Nov 2018	-		3.733	Continuing	Continuing	Continuing
Demonstration Satellites - Systems Engineering	FFRDC	Aerospace : Los Angeles, CA	0.000	0.000		0.278	Nov 2017	0.284	Nov 2018	-		0.284	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		24.237		24.296		-		24.296	Continuing	Continuing	N/A

Remarks

All efforts listed above are a continuation of PE 0603893C, MD12

Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Demonstration Satellites - Contract Support Services (CSS)	C/Various	MDA : AL, CO	0.000	0.000		3.197	Nov 2017	3.361	Nov 2018	-		3.361	Continuing	Continuing	Continuing
Demonstration Satellites - IT User Services	C/CPAF	Northrop Grumman/ Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	0.000	0.000		0.618	Dec 2017	0.628	Dec 2018	-		0.628	Continuing	Continuing	Continuing
Demonstration Satellites - MDA Civilian	Allot	MDA : Schriever AFB, CO	0.000	0.000		3.072	Oct 2017	3.108	Oct 2018	-		3.108	Continuing	Continuing	Continuing
Demonstration Satellites - Other Government Agency (OGA) Civilian	MIPR	SMC : Schriever AFB, CO	0.000	0.000		0.162	Nov 2017	0.164	Nov 2018	-		0.164	Continuing	Continuing	Continuing
Demonstration Satellites - Program Mission Support	Various	Various : Various	0.000	0.000		0.310	Nov 2017	0.232	Nov 2018	-		0.232	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Demonstration Satellites - UARC	C/CPFF	Utah University, Space Dynamics Laboratory : AL, AK, CA, CO, HI, MA, UT, VA	0.000	0.000		0.419	Nov 2017	0.428	Nov 2018	-		0.428	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		7.778		7.921		-		7.921	Continuing	Continuing	N/A

Remarks
All efforts listed above are a continuation of PE 0603893C, MD12

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	32.015	32.217	-	32.217	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency							Date: February 2018													
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)												
0400 / 4				PE 1206893C / Space Tracking and Surveillance System (STSS)				MD12 / Space Tracking and Surveillance System (STSS)												
Significant Event Complete ▲		Milestone Decision Complete ★		Element Test Complete ◆		System Level Test Complete ●		Complete Activity ◆												
Significant Event Planned △		Milestone Decision Planned ☆		Element Test Planned ◇		System Level Test Planned ○		Planned Activity ◇												
				FY 2017		FY 2018		FY 2019		FY 2020		FY 2021		FY 2022		FY 2023				
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2021												△								
STSS Demonstration Satellites On-Orbit Operations - 1Q2021-4Q2021												◇	◇	◇	◇					
MIS Operations - 1Q2021-4Q2021												◇	◇	◇	◇					
Mission Planning, Tasking and Analysis - 1Q2021-4Q2021												◇	◇	◇	◇					
MDSC TIL Operations - 1Q2021-4Q2021												◇	◇	◇	◇					
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2021													△							
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2021														△						
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2021														△						
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2022															△					
STSS Demonstration Satellites On-Orbit Operations - 1Q2022-4Q2022														◇	◇	◇	◇			
MIS Operations - 1Q2022-4Q2022														◇	◇	◇	◇			
Mission Planning, Tasking and Analysis - 1Q2022-4Q2022														◇	◇	◇	◇			
MDSC TIL Operations - 1Q2022-4Q2022														◇	◇	◇	◇			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2022															△					
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2022																△				
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2022																△				
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2023																	△			
STSS Demonstration Satellites On-Orbit Operations - 1Q2023-4Q2023																	◇	◇	◇	◇
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2023																		△		
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2023																			△	
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2023																				△

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2018	1	2018	1	2018
STSS Demonstration Satellites On-Orbit Operations - 1Q2018-4Q2018	1	2018	4	2018
MIS Operations - 1Q2018-4Q2018	1	2018	4	2018
Mission Planning, Tasking and Analysis - 1Q2018-4Q2018	1	2018	4	2018
MDSC TIL Operations - 1Q2018-4Q2018	1	2018	4	2018
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2018	2	2018	2	2018
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2018	3	2018	3	2018
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2018	4	2018	4	2018
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2019	1	2019	1	2019
STSS Demonstration Satellites On-Orbit Operations - 1Q2019-4Q2019	1	2019	4	2019
MIS Operations - 1Q2019-4Q2019	1	2019	4	2019
Mission Planning, Tasking and Analysis - 1Q2019-4Q2019	1	2019	4	2019
MDSC TIL Operations - 1Q2019-4Q2019	1	2019	4	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2019	2	2019	2	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2019	3	2019	3	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2019	4	2019	4	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2020	1	2020	1	2020
STSS Demonstration Satellites On-Orbit Operations - 1Q2020-4Q2020	1	2020	4	2020
MIS Operations - 1Q2020-4Q2020	1	2020	4	2020
Mission Planning, Tasking and Analysis - 1Q2020-4Q2020	1	2020	4	2020
MDSC TIL Operations - 1Q2020-4Q2020	1	2020	4	2020
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2020	2	2020	2	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD12 / <i>Space Tracking and Surveillance System (STSS)</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2020	3	2020	3	2020
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2020	4	2020	4	2020
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2021	1	2021	1	2021
STSS Demonstration Satellites On-Orbit Operations - 1Q2021-4Q2021	1	2021	4	2021
MIS Operations - 1Q2021-4Q2021	1	2021	4	2021
Mission Planning, Tasking and Analysis - 1Q2021-4Q2021	1	2021	4	2021
MDSC TIL Operations - 1Q2021-4Q2021	1	2021	4	2021
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2021	2	2021	2	2021
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2021	3	2021	3	2021
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2021	4	2021	4	2021
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2022	1	2022	1	2022
STSS Demonstration Satellites On-Orbit Operations - 1Q2022-4Q2022	1	2022	4	2022
MIS Operations - 1Q2022-4Q2022	1	2022	4	2022
Mission Planning, Tasking and Analysis - 1Q2022-4Q2022	1	2022	4	2022
MDSC TIL Operations - 1Q2022-4Q2022	1	2022	4	2022
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2022	2	2022	2	2022
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2022	3	2022	3	2022
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2022	4	2022	4	2022
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2023	1	2023	1	2023
STSS Demonstration Satellites On-Orbit Operations - 1Q2023-4Q2023	1	2023	4	2023
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2023	2	2023	2	2023
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2023	3	2023	3	2023
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2023	4	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MC12 / <i>Cyber Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC12: <i>Cyber Operations</i>	-	0.000	1.336	2.997	-	2.997	1.359	0.340	0.340	0.446	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Space Tracking and Surveillance System (STSS) Cyber Operations sustain the Missile Defense Agency (MDA) Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/ Information System Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA STSS mission systems. Activities in this Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Network/System Certification and Accreditation (C&A)	0.000	1.336	2.997
Articles:	-	-	-
<p>Description: This activity maintains the Assessment and Authorization (A&A) and C&A data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&Ms on all MDA information systems. This activity prepares and submits C&A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) /Certification Authority and the DAA. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of the MDA mission, test, and administrative systems.</p> <p>Recurring accomplishments include the following:</p> <ul style="list-style-type: none"> - Monitor and track cybersecurity and mitigations detailed in Information Technology security POA&Ms - Conduct cybersecurity design, engineering, and architecture planning for STSS information technology systems - Plan and test the cybersecurity controls for STSS and MDSC systems - Conduct SCA testing continuous monitoring of STSS and MDSC mission systems and provide POA&Ms to mitigate cybersecurity vulnerabilities <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MC12 / <i>Cyber Operations</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
- SEE ABOVE.				
FY 2019 Plans:				
- Initiates STSS system hardware replacement for cyber security requirements compliance				
FY 2018 to FY 2019 Increase/Decrease Statement:				
- Increase from FY 2018 to FY 2019 reflects initiation of hardware replacement to meet cyber security requirements				
Accomplishments/Planned Programs Subtotals		0.000	1.336	2.997
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
N/A				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MC12 / <i>Cyber Operations</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Network/System Certification and Accreditation (C&A) - Civ Cyber Labor	Allot	MDA : Various	0.000	0.000		0.165	Oct 2017	0.179	Oct 2018	-		0.179	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Contractor Support	C/Variou	MDA : AL, CO	0.000	0.000		0.000		0.218	Nov 2018	-		0.218	Continuing	Continuing	Continuing
Network/System Certification and Accreditation (C&A) - Information Assurance	C/CPAF	NGAS : Schriever AFB, CO/Redondo Beach, CA	0.000	0.000		1.171	Nov 2017	2.600	Nov 2018	-		2.600	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		1.336		2.997		-		2.997	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	1.336	2.997	-	2.997	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency						Date: February 2018									
Appropriation/Budget Activity 0400 / 4				R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>				Project (Number/Name) MC12 / <i>Cyber Operations</i>							
Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆	Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇						
MC12 Cyber Operations															

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MC12 / <i>Cyber Operations</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MC12 Cyber Operations	1	2018	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	-	0.000	1.556	1.741	-	1.741	1.621	1.606	1.701	1.701	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2018, Program Wide Support (PWS) was proportionately reallocated as a result of the Space Tracking and Surveillance System transfer from 0603893C Program Element. FY 2019 and out reflects proportional changes as a result of budget changes to this program element.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians, and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation and, provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	0.000	1.556	1.741
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	0.000	1.556	1.741

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.208	Jul 2018	0.409	Jul 2019	-		0.409	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPAF	Northrop Grumman : CO	0.000	0.000		1.348	Jan 2018	1.332	Aug 2019	-		1.332	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		1.556		1.741		-		1.741	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	1.556	1.741	-	1.741	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 45%;"></th> <th style="width: 5%;">FY 2017</th> <th style="width: 10%;">FY 2018</th> <th style="width: 10%;">FY 2019</th> <th style="width: 10%;">FY 2020</th> <th style="width: 10%;">FY 2021</th> <th style="width: 10%;">FY 2022</th> <th style="width: 10%;">FY 2023</th> </tr> </thead> <tbody> <tr> <td>MD40 Program-Wide Support</td> <td></td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> </tr> </tbody> </table>						FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	MD40 Program-Wide Support		◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MD40 Program-Wide Support		◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206893C / <i>Space Tracking and Surveillance System (STSS)</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2018	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	30.994	16.484	-	16.484	19.555	19.097	17.888	18.236	Continuing	Continuing
MD33: <i>MD Space Exp Center (MDSEC)</i>	-	0.000	30.233	15.745	-	15.745	18.707	18.236	17.055	17.410	Continuing	Continuing
MD40: <i>Program-Wide Support</i>	-	0.000	0.761	0.739	-	0.739	0.848	0.861	0.833	0.826	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

In accordance with the 2016 National Defense Authorization Act (NDAA), Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603895C is transferred to PE 1206895C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense (DOD) and national security.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$14.000 million is required to address warfighting requirements in support of continued trade studies, system engineering, modeling and simulations, and a prototype design for a potential missile tracking sensor/system.

A. Mission Description and Budget Item Justification

This program element primarily funds the Spacebased Kill Assessment (SKA) project, a Missile Defense Agency (MDA) experiment to demonstrate kill assessment from space. MDA experience with intercept testing on the Aegis BMD program provided solid understanding of the physics of kill assessment.

Several events set the stage for the kill assessment experiment that later became known as SKA:

- Section 237 in the FY 2014 National Defense Authorization Act directed MDA to improve kill assessment for the GMD program with an initial kill assessment capability by December 31, 2019
- An MDA study called the Space Layer Option Study found that disaggregated systems could provide sensor capabilities at lower costs
- A once in a decade opportunity became available when the commercial sector offered hosted payload services at costs far below what MDA could expect if it used traditional DOD space acquisition models

One feature of the SKA acquisition plays a crucial role in the execution of the experiment: schedule discipline. Since MDA cannot impact the schedule of the commercial host, maintaining schedule pace is priority #1 on the program. If SKA payloads are delivered late to the commercial host, they miss their opportunity to be launched into space.

SKA incorporates Government Accountability Office (GAO) recommendations to examine the operational feasibility of disaggregating large satellites (report number GAO-15-7) and to provide data for the business case for shared or dedicated satellite control, including the ground antenna networks (report number GAO-13-315). The SKA experiment will utilize a network of small IR sensors integrated onto commercial host satellites which, while on orbit, will observe missile defense intercepts and

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>
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deliver a kill assessment declaration to the BMDS. SKA has the opportunity to change the economics of the defense of the American homeland from enemy ballistic missiles.

This program element also funds engineering trade studies and concept evaluations for current and future space based sensors. The Missile Defense Tracking System (MTS) program will provide the Warfighter with persistent sensor capabilities for detection of ballistic missiles as well as future threats. The goal is to rapidly acquire a satellite tracking system using proven technologies and innovative acquisition approaches and partnerships.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$14.000M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+\$14.000M Project MD33 - MD Space Exp Center (MDSEC): required to continued trade studies, system engineering, modeling and simulations, and a prototype design for a potential missile tracking sensor/system. This is a base budget requirement.

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	16.994	13.348	-	13.348
Current President's Budget	0.000	30.994	16.484	-	16.484
Total Adjustments	0.000	14.000	3.136	-	3.136
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	14.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	3.136	-	3.136

Change Summary Explanation

Increase in FY 2019 supports efforts associated with SKA transition to operations

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$14.000 million is required to address warfighting requirements in support of continued trade studies, system engineering, modeling and simulations, and a prototype design for a potential missile tracking sensor/system.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018			
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>					Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
MD33: <i>MD Space Exp Center (MDSEC)</i>	-	0.000	30.233	15.745	-	15.745	18.707	18.236	17.055	17.410	Continuing	Continuing	
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-			

Note

In accordance with the 2016 National Defense Authorization Act (NDAA), Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603895C is transferred to PE 1206895C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$14.000 million is required to address warfighting requirements in support of continued trade studies, system engineering, modeling and simulations, and a prototype design for a potential missile tracking sensor/system.

A. Mission Description and Budget Item Justification

The SKA system is composed of two segments: a space segment and a ground segment.

- The space segment is composed of a network of small infrared (IR) sensors (sensors, processor cards and cabling), each mated to a different satellite. The total number of sensors and where they are placed in the network are specifically tailored for the kill assessment mission. The space segment includes key design features to improve its resiliency.
- The ground segment is a small network of desktop computers, servers and routers that monitor the health of the on-orbit sensors, command the sensors to perform the kill assessment mission and analyze the data to make a kill assessment determination for the Ballistic Missile Defense System (BMDS). The ground segment also includes the equipment necessary for communications security and information assurance. The Missile Defense Space Center (MDSC) is the communications hub for SKA data, routing SKA data between the commercial payload integrator and the SKA Payload Analysis Center.

The SKA sensors are hosted on satellites that are not developed by MDA, thus schedule performance is the highest priority of the experiment. Since the launch of the host satellites will not wait for hosted payloads that are delivered late, the management of the SKA project focuses on the ability to meet schedule commitments. In the past year, the commercial satellite host and the launch site owner have made small changes to the launch schedule; however, those changes have not affected SKA delivery commitments to the satellite integrator - the SKA project remains on schedule.

Missile Defense Tracking System (MTS)

Similar to the BMDS, a future Missile Defense Layer is composed of a system of systems in space:

- OPIR Global Scanning for alert and characterization (Air Force)
- Regional Staring Sensors for detection, warning and cueing (MDA)
- Narrow Field of View for precision fire control tracking (MDA)
- EO/IR Kill Assessment (MDA)

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>

Space provides critical vantage point necessary to address rapidly advancing threats across multiple regions of interest (i.e. trans-regional). The space layer will be a collaboration between MDA and the Air Force to provide a more robust and capable sensor architecture. MTS will be an integral part of a future operational space layer providing a robust and resilient Ballistic Missile Defense sensor architecture and will be designed to detect and track threats using space-based sensing.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>Title: Spacebased Kill Assessment</p> <p align="right">Articles:</p> <p>Description: The SKA project is an experimental system designed to demonstrate kill assessment for Homeland Defense.</p> <p>It includes:</p> <ul style="list-style-type: none"> - SKA sensor-host satellite integration and testing - On-orbit operations by experimenting and participating in BMDS flight tests - Analysis of operations and test data to inform future decision to add SKA to BMDS operational baseline - Development of kill assessment algorithms required to add SKA to the operational BMDS - Supporting engineering trade studies and concept evaluations for current and future space based sensors <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Complete on-orbit deployment, checkout, calibration and commissioning of the sensor network - Begin on-orbit operations by experimenting and participating in BMDS flight tests - Analyze operations and test data to inform future decision to add SKA to BMDS operational baseline - Support concept studies and analyses for assessment sensor payload configurations - Begin development of kill assessment algorithms required to add SKA to the operational BMDS - Initiate requirements and design of SKA Payload Analysis Center at the MDSC to continue experimental operations <p>FY 2019 Plans:</p> <ul style="list-style-type: none"> - Complete on-orbit checkout, calibration and commissioning of the sensor network - Begin development of capability for ground test participation required to add SKA to the operational BMDS - Begin integration support required to add SKA to the operational BMDS - Build out SKA Payload Analysis Center at the MDIOC <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>	0.000	16.233	15.745
	-	-	-
<p>Title: Missile Defense Tracking System (MTS)</p>	0.000	14.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<p align="right"><i>Articles:</i></p> <p>Description: Missile Defense Tracking System (MTS) is a future space-based missile tracking sensor/system concept to address warfighter requirements. The goal of this effort is to develop prototype space sensor concepts to: -Detect and track traditional and emerging threats -Support Theater Missile Warning (TMW)/Theater Missile Defense (TMD) mission -Leverage inherent multi-domain capabilities to provide as capable support to the Overhead Persistent Infrared (OPIR) Enterprise</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: -Trade studies -System engineering and acquisition strategy -Modeling and simulations -Ground segment design -Prototype concept design</p> <p>FY 2019 Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>	-	-	-
Accomplishments/Planned Programs Subtotals	0.000	30.233	15.745

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603882C: <i>Ballistic Missile Defense Midcourse Defense Segment</i>	1,034.861	957.097	926.359	-	926.359	1,046.235	847.537	585.956	572.619	Continuing	Continuing
• 0603884C: <i>Ballistic Missile Defense Sensors</i>	252.665	278.145	220.876	-	220.876	250.238	267.502	263.758	260.273	Continuing	Continuing
• 0603892C: <i>AEGIS BMD</i>	889.489	860.788	767.539	-	767.539	780.085	707.901	693.256	562.748	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>
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C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• 0603896C: <i>Ballistic Missile Defense Command and Control, Battle Management & Communication</i>	465.433	454.862	475.168	-	475.168	515.239	494.873	492.119	515.529	Continuing	Continuing
• 0603904C: <i>Missile Defense Integration and Operations Center (MDIOC)</i>	53.483	53.265	54.925	-	54.925	58.498	57.764	59.020	61.915	Continuing	Continuing
• 0603914C: <i>Ballistic Missile Defense Test</i>	294.441	316.193	365.681	-	365.681	349.388	320.909	320.332	327.584	Continuing	Continuing
• 0603915C: <i>Ballistic Missile Defense Targets</i>	521.784	460.125	517.852	-	517.852	441.827	383.739	405.909	417.800	Continuing	Continuing

Remarks

D. Acquisition Strategy

SKA leverages experience that the Johns Hopkins University Applied Physics Laboratory (JHU/APL) has with its extensive history of performing kill assessment activities and conducting experiments associated with the Aegis BMD program. JHU/APL is the developer of the SKA experiment and its primary subcontractor will be responsible for payload integration and hosting accommodation using a firm fixed price contract to contain costs. The SKA experiment uses a commercial satellite program as the platform host for a DOD payload, taking full advantage of a multi-billion dollar space and ground system that already exists. Since MDA and JHU/APL cannot impact the launch schedule of the commercial satellite host, fiscal stability and commitment is required which is a small tradeoff for the significant cost savings that commercial hosting provides.

E. Performance Metrics

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>
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Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Spacebased Kill Assessment - Development and Experimentation	C/CPFF	JHU/APL : Laurel, MD	0.000	0.000		12.232	Nov 2017	9.447	Nov 2018	-		9.447	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Experimental Ops Team	C/TBD	TBD : Schriever AFB, CO	0.000	0.000		2.677	Nov 2017	1.056	Nov 2018	-		1.056	Continuing	Continuing	Continuing
Spacebased Kill Assessment - MDSC Support	C/TBD	TBD : Schriever AFB, CO	0.000	0.000		0.000		0.744	Nov 2018	-		0.744	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Transition To Ops	C/Various	Various : MDA CO, AL	0.000	0.000		0.000		0.634	Nov 2018	-		0.634	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Transition to Ops (PRIME)	C/CPFF	JHU/APL : Laurel, MD	0.000	0.000		0.000		2.573	Nov 2018	-		2.573	Continuing	Continuing	Continuing
Missile Defense Tracking System (MTS) - Ground Segment	TBD	TBD : CO	0.000	0.000		3.800	Apr 2018	0.000		-		0.000	0.000	3.800	3.800
Missile Defense Tracking System (MTS) - Space Prototype Concept Activity	MIPR	SMC SpEC OTA : Various	0.000	0.000		0.400	Mar 2018	0.000		-		0.000	0.000	0.400	0.400
Subtotal			0.000	0.000		19.109		14.454		-		14.454	Continuing	Continuing	N/A

Remarks

All efforts listed above are a continuation of PE 0603895C, MD33

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Spacebased Kill Assessment - Contract Support Services (CSS)	C/Variou	Various : CO, VA	0.000	0.000		0.247	Nov 2017	0.193	Nov 2018	-		0.193	Continuing	Continuing	Continuing
Spacebased Kill Assessment - FFRDC	FFRDC	Various : CO, AL, MD, VA, CA	0.000	0.000		0.684	Nov 2017	0.791	Nov 2018	-		0.791	Continuing	Continuing	Continuing
Spacebased Kill Assessment - IT User Services	C/CPAF	Northrop Grumman : AK, CA, CO, HI, NM, VA	0.000	0.000		0.049	Nov 2017	0.053	Nov 2018	-		0.053	Continuing	Continuing	Continuing
Spacebased Kill Assessment - MDA Civilian	Allot	MDA : VA	0.000	0.000		0.212	Oct 2017	0.217	Oct 2018	-		0.217	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Program Mission Support	C/Variou	Various : CO, AL, MD, VA	0.000	0.000		0.132	Nov 2017	0.037	Oct 2018	-		0.037	Continuing	Continuing	Continuing
Missile Defense Tracking System (MTS) - Contract Support Services (CSS)	C/CPFF	Various : CO, AL, VA	0.000	0.000		3.600	Feb 2018	0.000		-		0.000	0.000	3.600	3.600
Missile Defense Tracking System (MTS) - FFRDC	MIPR	Various : CA, CO, NM, VA	0.000	0.000		3.500	Mar 2018	0.000		-		0.000	0.000	3.500	3.500
Missile Defense Tracking System (MTS) - MDA Civilian	Allot	MDA : CO, AL, VA	0.000	0.000		1.150	Feb 2018	0.000		-		0.000	0.000	1.150	1.150
Missile Defense Tracking System (MTS) - Program Mission Support	C/Variou	Various : CO, AL, VA	0.000	0.000		0.500	Feb 2018	0.000		-		0.000	0.000	0.500	0.500
Missile Defense Tracking System (MTS) - UARC	C/CPFF	Various : UT, MD	0.000	0.000		1.050	Feb 2018	0.000		-		0.000	0.000	1.050	1.050
Subtotal			0.000	0.000		11.124		1.291		-		1.291	Continuing	Continuing	N/A

Remarks
All efforts listed above are a continuation of PE 0603895C, MD33

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency							Date: February 2018				
Appropriation/Budget Activity 0400 / 4			R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>				Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>				
	Prior Years	FY 2017	FY 2018		FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals	0.000	0.000	30.233		15.745	-	15.745	Continuing	Continuing	N/A	

Remarks

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>
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	FY 2017			FY 2018			FY 2019			FY 2020			FY 2021			FY 2022			FY 2023		
Future System Prototype Design Activity				◇	◇	◇															
SKA Experimentation - 1Q2018-4Q2018				◇	◇	◇															
SKA Launch Campaign				◇	◇	◇															
SKA On-Orbit Check-out				◇	◇	◇	◇														
SKA Experimentation - 1Q2019-4Q2019							◇	◇	◇	◇											
SKA Experimentation - 1Q2020-4Q2020										◇	◇	◇	◇								
SKA Experimentation - 1Q2021-4Q2021													◇	◇	◇	◇					
SKA Experimentation - 1Q2022-4Q2022																◇	◇	◇	◇		
SKA Experimentation - 1Q2023-4Q2023																			◇	◇	◇

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD33 / <i>MD Space Exp Center (MDSEC)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Future System Prototype Design Activity	2	2018	4	2018
SKA Experimentation - 1Q2018-4Q2018	1	2018	4	2018
SKA Launch Campaign	2	2018	4	2018
SKA On-Orbit Check-out	2	2018	1	2019
SKA Experimentation - 1Q2019-4Q2019	1	2019	4	2019
SKA Experimentation - 1Q2020-4Q2020	1	2020	4	2020
SKA Experimentation - 1Q2021-4Q2021	1	2021	4	2021
SKA Experimentation - 1Q2022-4Q2022	1	2022	4	2022
SKA Experimentation - 1Q2023-4Q2023	1	2023	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD40: <i>Program-Wide Support</i>	-	0.000	0.761	0.739	-	0.739	0.848	0.861	0.833	0.826	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2018, Program Wide Support (PWS) was proportionately reallocated as a result of the Ballistic Missile Defense System Space Program transfer from 0603895C program element. FY 2019 and out reflects proportional changes as a result of budget changes to this program element.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Program Wide Support	0.000	0.761	0.739
Articles:	-	-	-
Description: N/A			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	0.000	0.761	0.739

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.015	Dec 2017	0.011	Jul 2019	-		0.011	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various; Multi : AL, CO, VA	0.000	0.000		0.746	Dec 2017	0.728	Apr 2019	-		0.728	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.761		0.739		-		0.739	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000	0.761	0.739	-	0.739	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>
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Significant Event Complete ▲	Milestone Decision Complete ★	Element Test Complete ◆	System Level Test Complete ●	Complete Activity ◆																
Significant Event Planned △	Milestone Decision Planned ☆	Element Test Planned ◇	System Level Test Planned ○	Planned Activity ◇																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 10%;">FY 2017</th> <th style="width: 10%;">FY 2018</th> <th style="width: 10%;">FY 2019</th> <th style="width: 10%;">FY 2020</th> <th style="width: 10%;">FY 2021</th> <th style="width: 10%;">FY 2022</th> <th style="width: 10%;">FY 2023</th> </tr> </thead> <tbody> <tr> <td>MD40 Program-Wide Support</td> <td></td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> <td>◇◇◇◇</td> </tr> </tbody> </table>						FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	MD40 Program-Wide Support		◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023													
MD40 Program-Wide Support		◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇	◇◇◇◇													

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Missile Defense Agency		Date: February 2018
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i>	Project (Number/Name) MD40 / <i>Program-Wide Support</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
MD40 Program-Wide Support	1	2018	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605502C / <i>Small Business Innovation Research - MDA</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	86.742	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	86.742
MD45: <i>Small Business Innovation Research</i>	-	86.742	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	86.742

Program MDAP/MAIS Code: 362

Note

Funds are transferred into this PE in the execution year.

A. Mission Description and Budget Item Justification

Small Business Innovation Research (SBIR) explores innovative concepts pursuant to Public Law 106-554 (Small Business Reauthorization Act of 2000) and Public Law 107-50 (Small Business Technology Transfer Program Reauthorization Act of 2001), which mandates a two-phase competition for small businesses with innovative technology that can be commercialized. SBIR and Small Business Technology Transfer (STTR) programs will develop new dual-use technology for future Missile Defense Agency (MDA) Ballistic Missile Defense Systems (BMDS) needs. Dual-use means that the technology will be judged on the potential for future private sector investment both as a vehicle for reducing development time and cost, unit costs of new BMDS technology, and as a route to national economic growth through new commercial products. MDA will conduct the competition, award, and manage the contracts.

B. Program Change Summary (\$ in Millions)

	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	86.742	0.000	0.000	-	0.000
Total Adjustments	86.742	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	86.742	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide</i> / BA 6: <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0605502C / <i>Small Business Innovation Research - MDA</i>
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Change Summary Explanation

FY 2017 funds were transferred to SBIR/STTR from other Program Elements in accordance with the SBIR/STTR Reauthorization Act of 2011

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency										Date: February 2018		
Appropriation/Budget Activity 0400 / 6					R-1 Program Element (Number/Name) PE 0605502C / <i>Small Business Innovation Research - MDA</i>			Project (Number/Name) MD45 / <i>Small Business Innovation Research</i>				
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD45: <i>Small Business Innovation Research</i>	-	86.742	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	86.742
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funds are transferred into this PE in the execution year.

A. Mission Description and Budget Item Justification

Small Business Innovation Research (SBIR) explores innovative concepts pursuant to Public Law 106-554 (Small Business Reauthorization Act of 2000) and Public Law 107-50 (Small Business Technology Transfer Program Reauthorization Act of 2001), which mandates a two-phase competition for small businesses with innovative technology that can be commercialized. SBIR and Small Business Technology Transfer (STTR) programs will develop new dual-use technology for future Missile Defense Agency (MDA) Ballistic Missile Defense Systems (BMDS) needs. Dual-use means that the technology will be judged on the potential for future private sector investment both as a vehicle for reducing development time and cost, unit costs of new BMDS technology, and as a route to national economic growth through new commercial products. MDA will conduct the competition, award, and manage the contracts.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Small Business Innovation Research	86.742	0.000	0.000
Articles:	-	-	-
<p>Description: The MDA's SBIR/STTR investments are divided into 16 Research Areas for the following key components:</p> <ul style="list-style-type: none"> -Aegis Ballistic Missile Defense (BMD): Develops Naval BMD Capability -Command, Control, Communication, Computer Intelligence Surveillance and Reconnaissance (C4ISR): Defines, develops and deploys an integrated Sensor and Command and Control (C2) capability for the Ballistic Missile Defense System -Program and Integration: Supervises the non-Aegis portfolio including Targets, Terminal High Altitude Area Defense (THAAD), Ground-based Midcourse Defense, and the Israeli programs -Test: Characterizes ballistic missile defense capability and supports fielding of an integrated and effective capability to the Warfighter -Advanced Technology: Develops technology to counter future threats 			
FY 2018 Plans:			
N/A			
FY 2019 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0605502C / <i>Small Business Innovation Research - MDA</i>	Project (Number/Name) MD45 / <i>Small Business Innovation Research</i>		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
N/A				
FY 2018 to FY 2019 Increase/Decrease Statement:				
N/A				
Accomplishments/Planned Programs Subtotals		86.742	0.000	0.000
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
N/A				
E. Performance Metrics				
N/A				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6: RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0606942C / <i>Assessments and Evaluations of Cyber Vulnerabilities</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	3.400	-	3.400	0.000	0.000	0.000	0.000	0.000	3.400
MC39: <i>Assessment and Evaluation of Cyber Vulnerabilities</i>	-	0.000	0.000	3.400	-	3.400	0.000	0.000	0.000	0.000	0.000	3.400

Program MDAP/MAIS Code: 362

Note

This is a new PE in FY 2019. This is a continuation of efforts funded within the Management and Support Office of the Secretary of Defense (OSD) PE 0604942DZ Assessments & Evaluation.

Pursuant to section 1647 of Public Law 119-92, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2016, and Congress mandated the Department of Defense (DoD) conduct cyber vulnerability evaluations of all major DoD weapons by December 31, 2019. The alternative provides \$84.1 million to the applicable Components for platform level assessments, platform mitigations, and red team enhancements. Missile Defense Agency received \$3.4 million in FY 2019 for Cyber Vulnerability Assessment and Mitigation.

A. Mission Description and Budget Item Justification

This program element (PE) provides funds for cyber vulnerability assessments of critical elements of the Ballistic Missile Defense System (BMD) that Missile Defense Agency (MDA) is responsible for conducting, as directed by Sec. 16470 of the Fiscal Year 2017 National Defense Authorization Act.

Resources will be used for assessments and non-recurring engineering for mitigations for elements of the BMD system that MDA is responsible for conducting.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0606942C / <i>Assessments and Evaluations of Cyber Vulnerabilities</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	0.000	0.000	3.400	-	3.400
Total Adjustments	0.000	0.000	3.400	-	3.400
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	3.400	-	3.400

Change Summary Explanation

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0606942C / Assessments and Evaluations of Cyber Vulnerabilities	Project (Number/Name) MC39 / Assessment and Evaluation of Cyber Vulnerabilities
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MC39: Assessment and Evaluation of Cyber Vulnerabilities	-	0.000	0.000	3.400	-	3.400	0.000	0.000	0.000	0.000	0.000	3.400
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Pursuant to section 1647 of Public Law 119-92, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2016, and Congress mandated the Department of Defense (DoD) conduct cyber vulnerability evaluations of all major DoD weapons by December 31, 2019. The alternative provides \$84.1 million to the applicable Components for platform level assessments, platform mitigations, and red team enhancements. Missile Defense Agency received \$3.4 million in FY 2019 for Cyber Vulnerability Assessment and Mitigation.

A. Mission Description and Budget Item Justification

N/A

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
Title: Cyber Vulnerabilities Testing	0.000	0.000	3.400
Articles:	-	-	-
<p>Description: Pursuant to section 1647 of Public Law 119-92, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2016, and Congress mandated the Department of Defense (DoD) conduct cyber vulnerability evaluations of all major DoD weapons by December 31, 2019. The alternative provides \$84.1 million to the applicable Components for platform level assessments, platform mitigations, and red team enhancements.</p> <p>Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-328, *1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments.</p> <p>FY 2018 Plans: N/A</p> <p>FY 2019 Plans: - Implement Cyber Vulnerability Assessment and Mitigation pursuant to Section 1647 of Public Law 119-92, the NDAA for FY 2016.</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0606942C / <i>Assessments and Evaluations of Cyber Vulnerabilities</i>	Project (Number/Name) MC39 / <i>Assessment and Evaluation of Cyber Vulnerabilities</i>
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
<ul style="list-style-type: none"> - Plan, coordinate, and execute cyber activities in developmental and operational test environments as identified in the Integrated Master Test Plan for cyber activities. - Continue to incorporate cybersecurity testing requirements into BMDS flight and ground test events; to include cyber planning requirements for GTD-07b (NORTHCOM/PACOM). - Develop efficiencies from lessons learned documented from prior cyber vulnerability assessments. <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>			
Accomplishments/Planned Programs Subtotals	0.000	0.000	3.400

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

D. Acquisition Strategy
N/A

E. Performance Metrics
N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0901598C / <i>Management HQ - MDA</i>
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	166.679	30.693	29.947	28.626	-	28.626	27.276	27.894	28.466	29.005	Continuing	Continuing
MD38: <i>Management Headquarters</i>	166.679	30.693	29.947	28.626	-	28.626	27.276	27.894	28.466	29.005	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Beginning FY 2017, the Management Headquarters Activity (MHA) Program Element (PE) 0901598C decreases due to Department of Defense (DoD) reform efforts to maintain major headquarter activities' civilian staffing at reduced levels. DoD efforts to establish a common MHA framework resulted in a net funding decrease due to the transfer of civilian manpower performing functions MDA considered MHA in prior years. Funding and civilian manpower performing these non-MHA functions were appropriately transferred to Program Wide Support. Implementation of prior year efficiencies continues through FY2020.

Reduced funds and manpower to implement additional management headquarters civilian reductions to meet 25% reduction level by FY20.

In FY 17 (-.467) was reprogrammed from the Management HQ program element to support cyber training, enhancements, and cyberspace activities.

A. Mission Description and Budget Item Justification

As prescribed by DoD Instruction 5100.73 Major Headquarters Activities, MDA's Management Headquarters PE supports the operation of MDA's management headquarters activities. This program element funds government civilian salaries and benefits, travel, contract support services, facility and logistics support functions, transportation subsidies, security and emergency management, and operations of non-fielded activities.

Management Headquarters Activities provide executive leadership planning, develop centralized agency policy, prepare and defend annual budget submissions, respond to external inquiries, and implement SECDEF and Presidential priorities. As a DoD research, development and acquisition agency, the Headquarters Activities provide cost efficient oversight, direction, and control of initiatives and processes that assure best value, high quality, on-time, and successful performance of MDA acquisition programs. This is accomplished by ensuring acquisition and procurement program management emphasizes systems engineering; incorporates life cycle management objectives; implements risk management; and assesses cost, schedule or performance trade-offs.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 6:</i> <i>RDT&E Management Support</i>	R-1 Program Element (Number/Name) PE 0901598C / <i>Management HQ - MDA</i>
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	31.160	29.947	28.024	-	28.024
Current President's Budget	30.693	29.947	28.626	-	28.626
Total Adjustments	-0.467	0.000	0.602	-	0.602
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.467	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• FY 2017 Request for Additional Appropriations	0.000	0.000	0.000	-	0.000
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.602	-	0.602

Change Summary Explanation

In FY 17 (-.467) was reprogrammed from the Management HQ program element to support cyber training, enhancements, and cyberspace activities.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency **Date:** February 2018

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0901598C / Management HQ - MDA	Project (Number/Name) MD38 / Management Headquarters
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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
MD38: Management Headquarters	166.679	30.693	29.947	28.626	-	28.626	27.276	27.894	28.466	29.005	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The MDA Headquarters provides oversight, direction and control over MDA's acquisition programs and fielded systems. The MDA Headquarters staff functions (government salaries, government travel, and contract support services) support the mission and operations of the world-wide MDA mission.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2017	FY 2018	FY 2019
<p>Title: MHA Civilian Salaries</p> <p align="right">Articles:</p> <p>Description: Provide mission support, oversight, and management of: - Acquisition, implementation of international initiatives to increase missile defense coverage to deployed forces and allies, efficiency-oriented administrative services, business operations, financial resources, human capital, real property, environmental compliance, general counsel, internal review, public affairs, and media release.</p> <p>Specific and/or unique accomplishments to each FY are as follows:</p> <p>FY 2018 Plans: - SEE ABOVE.</p> <p>FY 2019 Plans: -SEE ABOVE.</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: N/A</p>	18.159	18.366	19.625
	-	-	-
<p>Title: MHA Travel</p> <p align="right">Articles:</p> <p>Description: Provide mission essential government travel.</p> <p>FY 2018 Plans:</p>	0.991	0.990	0.857
	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency		Date: February 2018		
Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0901598C / Management HQ - MDA	Project (Number/Name) MD38 / Management Headquarters		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019
- SEE ABOVE. FY 2019 Plans: - SEE ABOVE. FY 2018 to FY 2019 Increase/Decrease Statement: N/A				
Title: MHA Utilities, Facilities, Operations, Subsidy, Transportation and Logistics Description: Fund utilities under host-tenant agreement at MDA, Fort Belvoir - Provide base operations at MDA, Fort Belvoir - Provide transportation subsidy to National Capitol Region employees - Provide ground transportation, shuttle, and motorpool services Specific and/or unique accomplishments to each FY are as follows: FY 2018 Plans: Beginning in FY 2018, HQ Utilities, Facilities, Operations, Subsidy, Transportation and Logistics reflect a decrease due to the transfer of non-headquarters functions from MHA to Program Wide Support, multiple program elements. This transfer was the direct result of DoD efforts to establish a common MHA framework as a result of Department of Defense (DoD) reform efforts to maintain major headquarters activities' framework. FY 2019 Plans: N/A FY 2018 to FY 2019 Increase/Decrease Statement: N/A		Articles: 2.131 -	0.000 -	0.000 -
Title: Security and Emergency Management Description: - Provide access control and circulation enforcement for all visitors, security clearance verification, physical security checks, and information security inspections - Maintain global security situational awareness from the Global Security Operations Center (GSOC) and provide security planning and support for conferences and special events - Provide first response and emergency assessment to emergency situations and respond to alarms to include Sensitive Compartmental Information (SCI) and Special Access Program (SAP) facilities		Articles: 3.384 -	0.000 -	0.000 -

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency	Date: February 2018
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Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0901598C / Management HQ - MDA	Project (Number/Name) MD38 / Management Headquarters
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019
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Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:
Beginning in FY 2018, Security and Emergency Management reflect a decrease due to the transfer of non-headquarters functions from MHA to Program Wide Support, multiple program elements. This transfer was the direct result of DoD efforts to establish a common MHA framework as a result of Department of Defense (DoD) reform efforts to maintain major headquarters activities' framework.

FY 2019 Plans:
N/A

FY 2018 to FY 2019 Increase/Decrease Statement:
N/A

Title: MHA Contract Services	6.028	10.591	8.144
Articles:	-	-	-

Description: - Provide contract support services to mission activities for acquisition, business operations, internal review, general counsel, administrative support, public affairs, and international affairs.

Specific and/or unique accomplishments to each FY are as follows:

FY 2018 Plans:
Beginning in FY 2018, Contract Services reflects an increase due to the transfer of MHA contract support previously programmed Program Wide Support activities, multiple program elements. This transfer was the direct result of DoD efforts to establish a common MHA framework as a result of Department of Defense (DoD) reform efforts to maintain major headquarters activities' framework.

FY 2019 Plans:
- SEE ABOVE.

FY 2018 to FY 2019 Increase/Decrease Statement:
N/A

Accomplishments/Planned Programs Subtotals	30.693	29.947	28.626
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C. Other Program Funding Summary (\$ in Millions)
N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Missile Defense Agency Date: February 2018

Appropriation/Budget Activity 0400 / 6	R-1 Program Element (Number/Name) PE 0901598C / Management HQ - MDA	Project (Number/Name) MD38 / Management Headquarters
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C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A