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NATO ARMY ARMAMENTS GROUP (NAAG)

NAAG LAND CAPABILITY GROUP DISMOUNTED SOLDIER SYSTEM (LCGDSS)

LCGDSS POWER White Paper

Note by the Land Adviser

References: 1. LAMP ref: DSS-005
2. Ref: 1-AC/225(DSS)DS(2022)0002

1. At the Fall 2022 meeting of the LCGDSS (Ref.1), the POWER Sub-Group was tasked to provide a "white paper" explaining the work achieved and on-going regarding the energy/power architecture of Dismounted Soldier System.

2. In response, the POWER Sub-Group submits at enclosure, a practical and schematic document in the format of a presentation.

3. The document is herewith published for future reference, and for consideration of other relevant communities working in the Dismounted Soldier System domain.

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NATO
Energy and Data in Dismounted Soldier Systems

Power, Data and Physical connectors

for

Command, Control, Communications, Computer, and Intelligence – C4I

Scope and Goal

- **Our scope** is the NATO effort with regard to soldier Power and Data (C4I) architecture.
- **Our goal** is to compile the NATO efforts in the field of C4I interface standardization.

- What is in this slide deck?
  - Overview of NATO Data and Power standards and applications for the Dismounted Soldier Systems (DSS)
  - Building blocks as foundation for future developments
  - Existing boundary conditions, and possible gaps

Why?

The reasons for C4I interface standardization are:

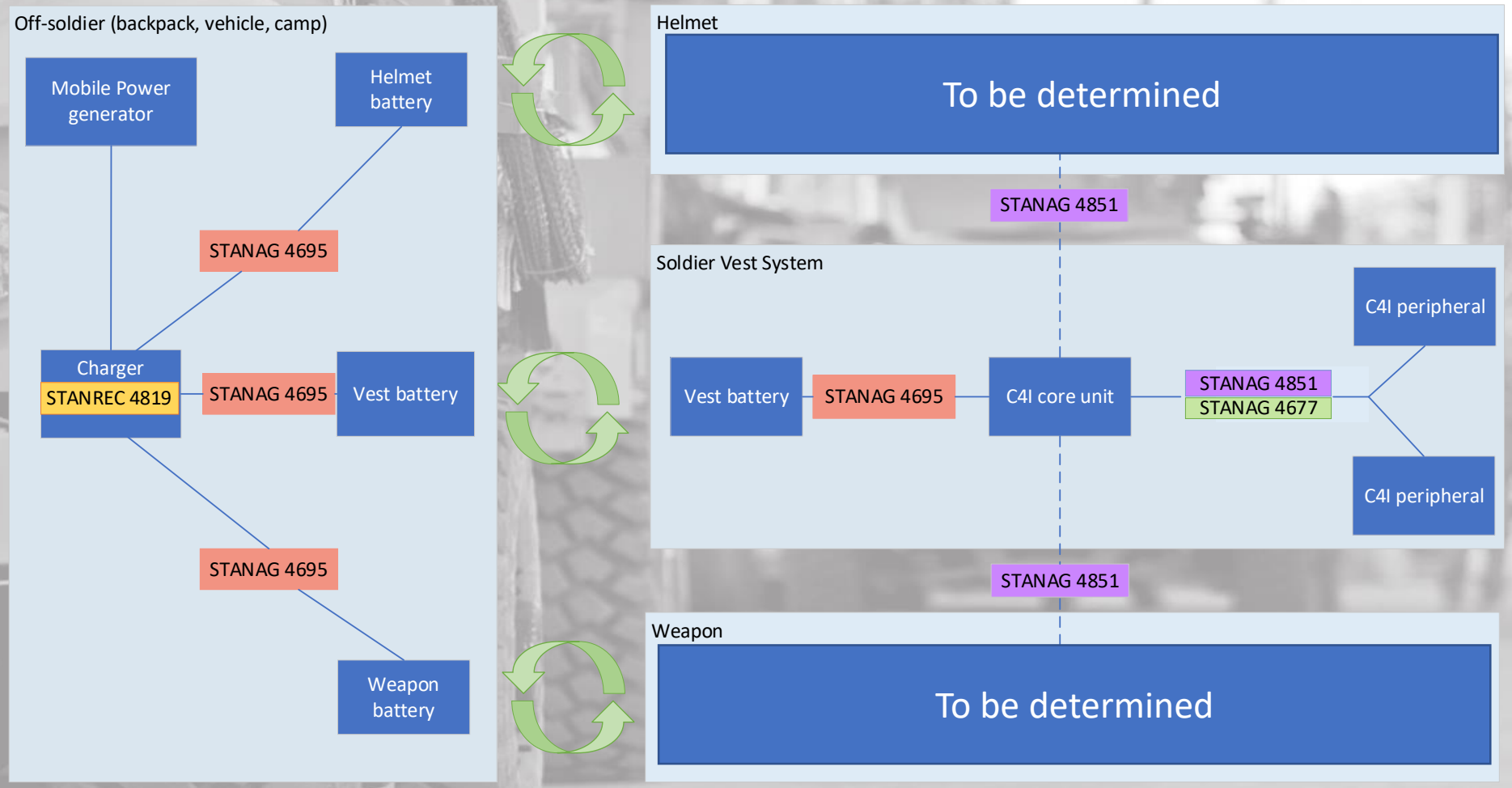
- To reduce the cognitive, physical and logistical burden (incl. minimizing cable complexity and reducing parts counts through commonality);
- To enable equipment best suited for specific missions;
- Promote third party competition, innovation and diversity for product development with modular components;
- Compatibility with existing and emerging power sources
- Allow incremental improvements of the soldier systems and future expandability
- Provide electrical safety provisions and redundancy through commonality
- To make optimal use of commercial-off-the shelf-equipment (COTS);
- To reduce the whole life cost of ownership.

Equipment

Soldiers are equipped with a large range of equipment that contribute to Command, Control, Communications, Computer, and Intelligence. These include, but are not limited to:

- Vest-mounted **dismounted soldier systems** (DSS), powered equipment including an intra-team radio, computer and (head-up) display.
- Batteries used as **central power source** in a DSS, connected to an energy distribution system to power multiple pieces of equipment of the DSS.
- **Individual device batteries**, used in individual equipment such as radio's, sensors and camera's, often specifically designed for that piece of equipment.
- **Soldier power managers**, devices with multiple ports enabling power management (conditioning and routing of power).
- **External power sources**, such as fuel cells, small generators, solar panels and kinetic energy harvesters.
- **Squad level chargers**, able to charge multiple batteries

Dismounted Soldier System power + data related STANAG and STANREC

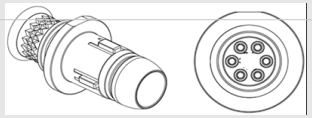


STANAG 4695 Soldier Power interface between the DSS and power sources

STANAG 4851 Soldier Power/Data interface between the DSS and ancilleries

STANREC 4819 Charging interface – Smart charging

STANAG 4677 Soldier System data protocol



One physical interface, multiple applications, multiple vendors



NATO standards

STANAG4677 – Battle Management System (BMS) data

The functions of STANAG4677 are:

- Communication interoperability through a standardized exchange of information between Command, Control, Communication and Computer systems (C4)
- Divided into Security (threats + threat consequences)/ Data model / Loaned Radio / Information Exchange mechanism / Network Access

STANAG4695 – Soldier Power and battery data interface:

This standardization is based on smart batteries that communicate status so that different types of batteries can be safely charged in generic chargers.

- STANAG 4695 is the Soldier Power and Data Connector Standard between Dismounted Soldier System (DSS) and Soldier Power Source and Ancillery Devices.
- EESI: External Energy Source Interface. The interface that enable a STANAG 4695 compliant energy source to connect to an external interface.

NATO standards

STANAG4851 Power and data interface

The Allied Engineering Publication AEP- 4851 defines the NATO standard interface between a nation's dismounted soldier systems and (another) nation's ancillary devices such as loaned radios, sensors, GPS, Night Vision Goggles (NVG), Laser Range Finder (LFR) . It provides a physical power and data interface, using DC power, electrical protection and a USB interface (2.0 or 1.X specifications).

The correct assignment of receptacles and sockets allows the systems to distinguish between a power connector (AEP 4695) and a data and power connector (AEP 4851)

STANREC4819 Charger defines the NATO (physical connector and communication) interfaces and requirements to allow one Nation's dismounted soldier batteries to be charged on another Nation's battery charger. This applies specifically to smart batteries and smart chargers.

- STANREC compliant batteries and chargers shall provide a communications interface meeting SMBus specification.