

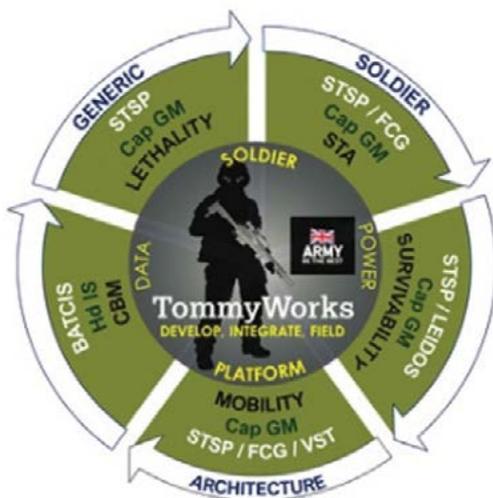


UK Generic Soldier Architecture: the present and the future

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PRESENT

The UK Army has stated that the future soldier will be fully transformed, embracing and exploiting the digital age over the next few years. TommyWorks is a newly formed team establishing itself as the Integrated Soldier System platform authority, conducting systems integration of equipment and capability integration across the Defence Lines of Developments. TommyWorks now has the responsibility of developing, integrating and fielding the Integrated Soldier System and longer term the 24hour Integrated Digital Soldier.



TommyWorks and the wider programme links

Ultimately the aim is to improve and expedite the integration of new technologies onto soldiers for the express purpose of improving their effectiveness. A critical enabler to TommyWorks and the MoD realising the Future Force is through embracing an Open Architecture approach, specifically the UK's mandated Generic Soldier Architecture

(GSA). GSA was developed in 2012 to ensure open, modular and scalable soldier equipment is procured and integrated with minimum configuration and re-work. The underpinning principles to the GSA approach being:

Modular in design: Treating the soldier as a system with a modular construct, designed in a way that modules have precisely defined and public owned interfaces.

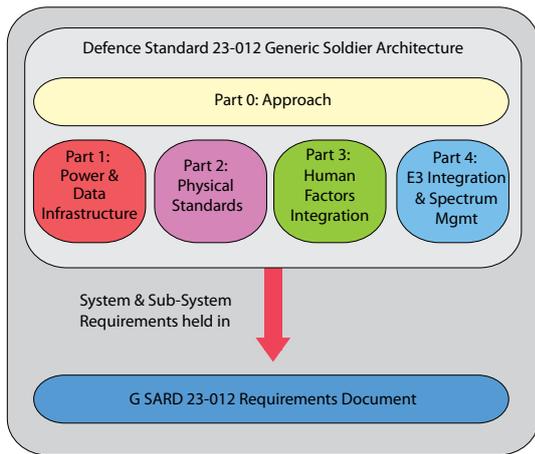
Scalability: Providing the ability to scale up and scale down integrated equipment and functionality, notably for integrated power and data network infrastructure.

Free from restrictions of use and based on Open

Standards: Being vendor agnostic and having the ability for a third party to integrate new components or functions into an existing system, realised through the use of existing, open and enduring standards.

Over the last two years with strong collaboration from Industry experts, the UK has been developing the GSA approach and has updated and published Defence Standard 23-012 'Generic Soldier Architecture'. Several areas of GSA have been developed, however the most fundamental changes have been in connectors, Human Factors Integration (HFI) and the scope and boundary of the architecture.

GSA now defines a soldier's data connector as the NATO 4695 (Nett Warrior PAN pin assignment) and the power connector as the STANAG 4695 connector. The previous scope of the architecture received criticism over its boundary and its logical view of the Dismounted Soldier. GSA is focused on the personal soldier domain for an Integrated Soldier System, with the architecture specifying 'intra' soldier requirements. The Integrated Soldier System has three main sub-systems, the Torso, Helmet and Weapon, all of which have the power, data and physical interfaces defined with open standards. With there being a lack of centralised guidance on the processes for Human Factors



New structure of Defence Standard 23-012

Integration for soldier-worn equipment, GSA now contains this guidance to equipment designers and is available on the Land Open Systems Portal. Over the last few months a GSA site has been added to the portal and is being used as the place for collaboration and a repository for soldier-based research related to GSA.

FUTURE

With the change of pace in technologies and equipment for soldiers, it has been widely accepted that GSA must continue to evolve to meet the needs of the future soldier. The integration challenges with the soldier have been well recognised and documented, with many nations encountering similar integration issues. Over the next few years the UK will be focusing on developing GSA and the Defence Standard in the following areas:

Soldier Data Network: Arguably the most challenging area for the UK to address is the soldier's personal data network. A critical layer in the network stack is the middleware, the unsung hero in an integrated soldier's software architecture. Whilst GSA has stated its intention for middleware, ongoing studies and implementations continue to be the focus before an open middleware standard can be selected from four down selected options (DDS, Lean Services Architecture, MQTT and ZeroMQ). The aim is to complete this work in 2021 and select one of the above middlewares for GSA. The digital soldier not only needs GSA to define a middleware, over the next year the soldier's network stack will be standardised, with each different layer being defined with an open standard/protocol. USB 2 is specified in the latest Defence Standard, however recognising that over the next few years when connector technologies mature and become widely available the UK will transition from USB 2 to USB 3.2/4.

Wired and Wireless: Wireless technology is seen as the future by many, with the dreaded cable management strengthening the wireless argument as more equipment gets integrated on the soldier. Whilst GSA still mandates wired solutions, it is accepted there is now a need for wireless technologies to be more fully understood and for

the architecture to be flexible and enable both a wired and wireless soldier solution. With there still being concerns around security and safety of soldier wireless technologies, these will be areas of focus.

Industry White Papers: Without integrated soldier-worn power, there really is no future Integrated Soldier System. From lessons learnt from the quantity of different batteries carried by soldiers on Operation Herrick, the future approach must ensure weight reduction remains a key priority when developing the power architecture. Whilst the debate around integrated in or integrated on for cable management continues to be a hot topic, the UK will be inviting industry to inform the way ahead on areas such as this, through a series of small scale funded White Paper opportunities.

Audio: The current architecture does not include Audio within its scope, where strictly power, data and physical interfaces have been defined. Without audio the structure of communication in the field is dramatically impacted and GSA must ensure appropriate audio interfaces and the physical infrastructure are included in the soldier's architecture. GSA will be looking at what open standards and protocols should be mandated for a soldier's audio architecture.

Land Platform Integration: Dismounted soldiers still require the ability to seamlessly integrate into military vehicles, especially the next generation of digital vehicles. Understanding the interface touch points to ensure power and data interoperability between the soldiers and vehicles remains a challenge but one that is firmly within our sights. With the emergence of Robotics & Autonomous Systems (RAS) in the land environment, specifically unmanned ground vehicles and nano unmanned air systems, further work is needed to understand the information exchange requirements with soldiers and how the soldier's architecture should support this. Over the next few years as RAS experimentation continues to mature, ensuring the soldier is at the forefront of decision making must be a priority.

The long-term future vision for GSA is clear, enable the transformation of the soldier into the 24hr Integrated Digital Soldier through the implementation of open architecture. This vision has the key focus on weight reduction for the soldier as an overarching key principle to the architecting decision process. There are no illusions against the challenge that faces the MoD to realise this vision. It remains heavily dependent on maintaining a good working relationship with industry, maturing our knowledge through scientific research and real-life experimentation. ■

For more information on UK GSA or Defence Standard 23-012 contact the LOSA office:
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To register for an account on the Land Open Systems Portal, use the link - <https://landopensystems.mod.uk>