TECH INSIGHTS

THE CONNECTIVITY CHALLENGE

CONNECTING THE DISMOUNTED SOLDIER

From tactical drone controllers to digital optics to biometrics and high-definition video cameras, today's commanders face a huge and growing array of soldier wearable digital equipment. As wearable devices proliferate, dismounted soldiers must manage huge quantities of digital data and increasing requirements for wearable power supplies. How will commanders and acquisition authorities navigate this challenge?

Three big questions face land force leaders as they adopt digital equipment intended for the dismounted soldier:

1. *What digital equipment will the dismounted soldier carry?*
2. *Where and how is digital data processed?*
3. *How can dismounted soldier digital equipment enhance tactical command and control, including development of the Common Operating Picture?*

The answers to these questions are taking shape as products and programs evolve. At Fischer Connectors, we believe that emerging technology and operational requirements are pointing toward a new way of thinking about dismounted soldier digital equipment – a concept we call the "Connected Soldier".

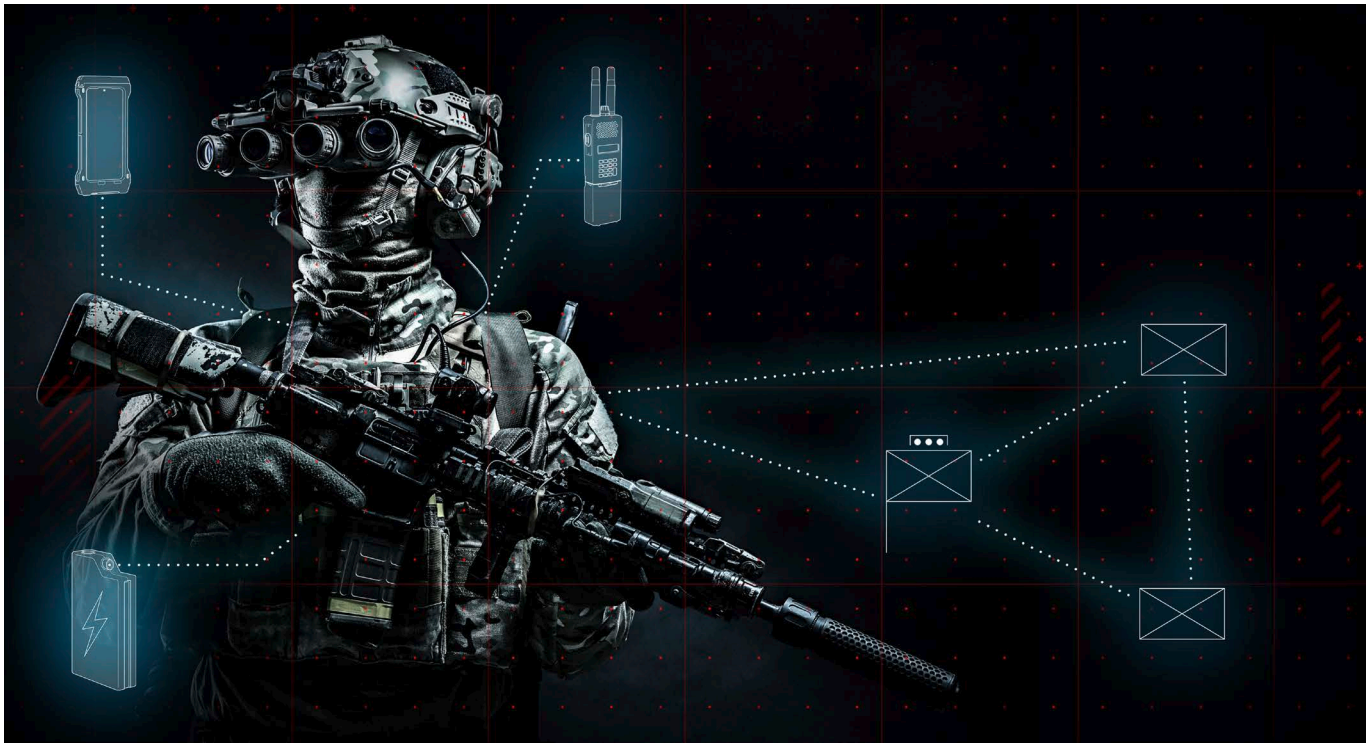
WHAT DIGITAL EQUIPMENT WILL THE SOLDIER CARRY?

Does every dismounted soldier, or squad, or platoon need soldier biometrics, laser detectors, augmented reality, machine translation and high-resolution video? How much is enough, or too little?

Overloading the soldier with unnecessary equipment risks combat effectiveness and challenges supply chains. At the same time, commanders want to understand the tactical environment and optimize maneuver and supporting fires. Today, land forces are trying two different approaches to solve this problem.

The first approach can be called the "Big System" approach. Many national-level efforts applied centralized, comprehensive designs like IVAS, Soldato Futuro, FELIN, RATNIK and many other attempts to define a single "Digital Soldier" solution. The second approach can be described as a "Standards-Based" approach.

The Big System approach has not worked, although it produced some useful learning. IVAS and other Big Systems showed land forces the challenges with centralized design. They include lack of consensus on requirements, poor feedback and low acceptance from soldiers, high training requirements, excessive cost and low flexibility.



A related challenge with the Big System approach is that these systems stifle innovation. When a single prime contractor or team owns the whole soldier system, smaller companies face high hurdles in bringing new technologies into these closed systems. The result is less innovation.

The Big System approach has struggled to win adoption. At the same time, the "Standards-Based" approach seems to be making steady progress. The "Standards-Based" approach is embodied in the US Army Nett Warrior standard, NATO STANAG 4695, the UK GSA, shareware-based battle management systems like ATAK and other national and multinational standards for the emerging Internet of Battlefield Things. The standards-based approach allows land forces maximum flexibility in selecting devices for acquisition and for application in specific unit and mission settings.

Unlike the Big System approach, the right use of the standards-based approach can promote innovation. This is apparent in the commercial world, where standards like the Microsoft and Apple operating systems, data transfer standards like USB and HDMI, and similar industry standards have promoted successful entrepreneurial efforts to develop hardware and software within the environment created by standards.

While the standards-based approach may be more practical, challenges remain. Who sets standards? How, when and by whom are they changed? How can land forces address the problem of abundance: When there are many emerging technologies and capabilities that comply with standards, how do acquisition, training and fielding organizations get the right equipment to the right soldier at the right time? A look at the recent history of the US Army PEO Soldier, as this organization has evolved to define its own scope and priorities, shows the significance of this challenge.

If the commercial world is a good analogy, then land forces should focus on the standards-based approach. Land forces will need to adapt to operate in a world where standards are defined, and hardware and software innovation is the responsibility of industry. Fischer Connectors has made this bet, by developing soldier connectivity products using published standards – like the Next Generation Hub standard embodied in the KEYSTONE series of tactical hubs, and the Nett Warrior standard used to develop Fischer UltiMate power and data connectors.

WHERE IS DATA PROCESSED AND STORED?

Data generated by soldier-wearable sensors and battle management systems is increasing by orders of magnitude. Where will all this data be processed? Does the soldier system just send lots of raw data from the tactical edge, or does the dismounted soldier carry computing and data storage capability?

Land forces are applying two broad approaches to answer these questions: The first can be called "Soldier as Terminal" , and the second is "Soldier as Data Processor". In the "Soldier as Terminal" approach, little or no sensor data is stored or processed on the soldier's wearable equipment. The dismounted soldier relies on an End User Device (EUD) – a tactical phone, tablet or drone controller – to process some local imagery and display the Battle Management System.

In the "Soldier as Data Processor" approach, sensor and other data are processed on a soldier-worn computer or smart hub. This edge-processing approach is familiar in civilian applications where security, training and maintenance are not significant challenges.

The choice between these approaches matters a lot. More computing and data storage on the soldier's wearable gear means higher cost of dismounted soldier equipment, higher training and maintenance requirements and greater operational security challenges when hardware is compromised.

Fischer Connectors believes that cost and complexity will push dismounted soldier equipment toward minimal on-soldier processing and storage. Soldier-level data processing can be limited and concentrated in a single secure end-user device like a tactical phone running the soldier's Battle Management software. This approach maximizes data security – because minimal data is stored on the soldier's devices. Avoiding soldier-level data processing and storage also minimizes training and updating requirements.

Fischer Connectors enables this approach with the KEYSTONE series of tactical hubs. KEYSTONE hardware manages flows of power and data on the dismounted soldier's digital equipment. KEYSTONE stores no data and has no internal computing capability. KEYSTONE gives dismounted soldiers a low-cost, zero maintenance, zero training "Plug in and it works" hardware solution for managing soldier digital gear. With KEYSTONE, data processing and storage happen as far from the tactical edge as possible.

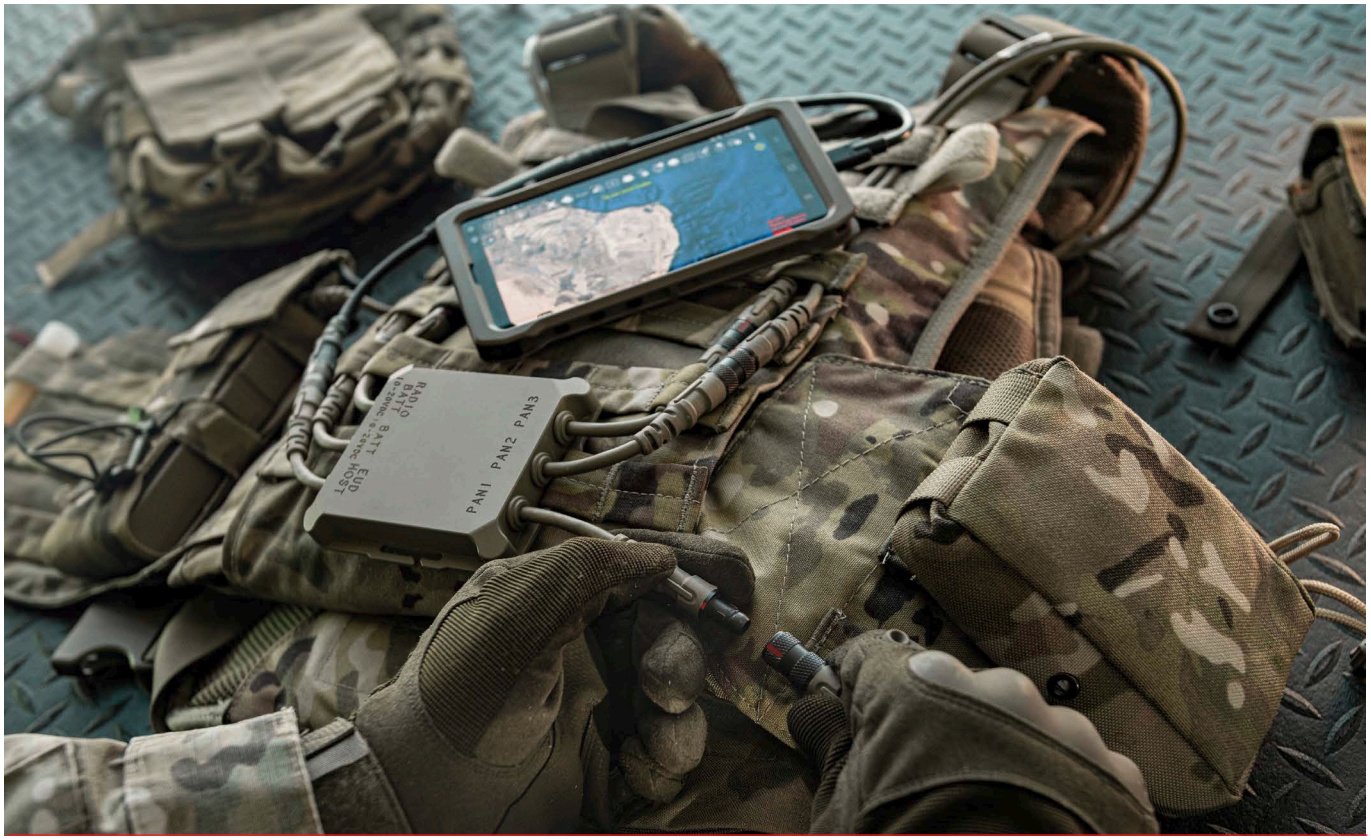
HOW DOES DISMOUNTED SOLDIER DATA IMPROVE TACTICAL COMMAND AND CONTROL?

Reliable PLI, imagery from soldier-worn cameras and digital data from wearable sensors might make valuable contributions to achieving a Common Operating Picture – or it might overwhelm commanders and dismounted soldiers with excessive, useless or even inaccurate data.

When every soldier is both a sensor and a shooter, there is real potential for commanders to be overwhelmed with digital input. At the same time, the individual soldier could be overwhelmed with sensor data and requests for data arriving on the EUD.

How will commanders decide what data is relevant, and who gets the data? Will land forces allow or even require individual soldiers and small unit commanders to filter and sort data? Or can automated rules and procedures allocate data?

The goal is better, faster decisions so the solution is not obvious. Nor can the problem be wished away by claiming that artificial intelligence will provide a magical answer. The best answers will emerge through exercise and operational experience, combined with the seasoned judgment of commanders at every level. While delivering timely, accurate digital data from soldier-worn sensors to commanders and shooters is a matter of engineering, the practical application of this data is a matter of military art and sound tactical judgment.



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YOUR ARMY'S PARTNER FOR CONNECTING THE DISMOUNTED SOLDIER

Fischer Connectors is an active participant in the debates about Connected Soldier issues. As the provider of KEYSTONE series of tactical hubs, and the connectors and cable used to equip the Connected Soldier, Fischer Connectors sees the connectivity challenge from the perspective of the dismounted soldier. Fischer Connectors products give soldiers and commanders the flexibility they need to operate effectively on the digital battlefield.

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