Special Operations Forces (SOF)

Dual Redundancy for Denied Environments – From System to Soldier

By Mike Sutton
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According to the [Strategic Defence Intelligence Report](#) (August 2017), the global military GPS-GNSS devices market is expected to increase to US$2.8 Billion by 2027. This increased usage has expanded to include many software applications in addition to navigation and tracking: Target acquisition, missile guidance, search and rescue, coordinate bombing, precision survey, instrument approach, range instrumentation, remotely piloted vehicle operations, bare base operations, close air support, C4 (command, control, communications, and computers), intelligence, surveillance, and reconnaissance [C4ISR].

These types of applications are in use throughout military technology, but particularly within the SOF community.

One factor driving expenditure in the sector is the introduction of new GNSS systems such as Galileo, BeiDou and IRNSS, which is leading to new procurements and helping the GPS/GNSS sector to sustain spending over the next decade. In addition, GPS technology itself is going through a stage of robust evolution, and new technologies are expected to have a positive impact on the industry. For example, the US's GPS III satellites program, which is projected to be worth US$7.3 Billion. Anti-jamming capabilities have been increased eightfold.

The result of all this growth has been equipment that is lighter, more capable, with faster processing and a small form factor, and low SWAP (Size, Weight, and Power). Smaller units now extend from the system or air or ground all the way down to the support vehicle and/or soldier. A few examples: SAR and body-worn GPS systems for all, and low SWAP ruggedized PNT solutions for LTATVS (Lightweight Tactical All-Terrain Vehicles), SOC-R (Special Operations Craft-Riverine), RATTS (Rescue All Terrain Transports), and MRAPs (Mine-Resistant, Ambush Protected vehicles).

This growth also means specific challenges that the military must address to remain competitive.

Challenge	Solution
Degraded Visual Environment (DVE)	Provide aircrews with situational awareness to avoid mishaps in cases of all-weather brown-out, white-out, and cable/obstacle warning. Preference will be for lightweight, integrated and multi-spectral sensor fusion with minimal A-kit impacts that fit into existing onboard sensors. DVE solutions should encompass all aspects of the flight profile to include takeoff, en route, approach, and landing.
Radio Frequency Countermeasures	Radio frequency receivers and countermeasures that could provide significant improvement in threat avoidance and countermeasure capabilities for aircraft.
Operate in Denied Areas	Technologies to allow SOF platforms to operate in denied airspace (anti-jam GPS, anti-spoof, threat avoidance, electronic warfare systems, LPI/LPD systems, etc.).
Platform Modular Design with Open Systems Architecture	Aircraft flight systems segregated from mission systems that use commercial standards and open systems architecture.
Enhanced Situational Awareness Systems	Enhanced pilot, crew member and passenger situational awareness systems for installation on manned aircraft to provide battle space awareness and display capabilities.
Terrain Awareness/ Alerting Systems	Active and passive terrain awareness systems for installation on manned aircraft with integrated anti-jam and anti-spoof technologies.
Advanced Data Management	SOF requires technologies that provide automatic data synchronization, fusion, mining, indexing, and dissemination of data collected by widely dispersed SOF resources
Advanced Situational Awareness in All Environments	The ability to fuse ad correlate battlefield information from a variety of sources and display it in an accurate and shared common operational picture. This includes fusion of full motion video with other sources of information, visually displayed in near real time, to significantly improve the opportunities for knowledge management and discovery during operations.

Source: SOF Acquisition, Technology, and Logistics www.socom.mil

Conclusion

SOF applications need zero failure, dual-redundancy equipment that sustains and extends capabilities, in and out of denied environments. The need for a light-weight ruggedized PNT solution becomes essential to live up to one SOF community motto: Anytime, Anyplace (AFSOC). A ruggedized PNT solution can also become the failover for mounted and dismounted soldiers and systems.

How can Orolia help?

Through our brands, Spectracom and McMurdo, Orolia provides virtually fail-safe GPS/GNSS and PNT products and solutions for our customers' most mission critical needs. Contact us for further information about our Resilient PNT and Military Beacon and Tracking solutions.

About Mike Sutton

Mike Sutton is an Orolia applications engineer specializing in aerospace and defense. He has more than 20 years in the RF and data communications Industry supporting DoD, PSPC and international government programs. His expertise includes software test, systems engineering and applications engineering. Mike holds a BS in computer science with a concentration in data technologies from SUNY Empire State, plus a variety of military and technology certificates. He spent six years as an active duty service member for AFSOC (Air Force Special Operations Command), and three years with the 914th Logistics Group, Air Niagara Reserve Station.

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