

UAVs Thrive With PEO IEW&S Payloads, Ground Assets

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As Unmanned Aerial Systems (UAS) have become increasingly more important to military operations, so, too, has the role that the Program Executive Office Intelligence, Electronic Warfare, and Sensors (PEO IEW&S) plays in supporting the U.S. military's eyes in the sky.



The Fire Scout will carry the TSP as well as STARLite, which will provide the future system with SAR/GMTI. (Photo courtesy of PM FCS.)



The CSP and STARLite will provide the Sky Warrior with a broad spectrum of coverage, allowing the system to be an all-in-one tool for conducting ISR missions. (Photo courtesy of PEO Aviation.)

PEO IEW&S develops, fields, and sustains numerous systems that play a vital role in UAS operations. The PEO, headquartered at Fort Monmouth, NJ, is responsible for systems that are involved in the full cycle of UAS missions. Through its various program managers (PMs), PEO IEW&S touches multiple facets of the UAS world—from payloads to systems—that make sensor information and imagery available for analysts who can, in turn, package information for the commanders who are responsible for cueing an aircraft for additional missions.

The PEO's involvement in UASs includes both airborne and ground-based systems. Ground-based systems that are currently fielded to the warfighter include the Distributed Common Ground System-Army (DCGS-A) and the Base Expeditionary Targeting and Surveillance Systems-Combined (BETSS-C). The Tactical Signal Intelligence (SIGINT) Payload (TSP), Electro-Optic/Infrared/Laser Designator (EO/IR/LD), and the Synthetic Aperture Radar/Ground Moving Target Indicator (SAR/GMTI) represent aerial-based systems that the

PEO is producing to complement the bevy of options available for UASs.

SAR/GMTI and EO/IR/LD

Providing the warfighter with a view of the operational environment and an ability to neutralize a threat with UASs is a fundamental portion of the systems provided by Product Manager Robotics and Unmanned Sensors (PdM RUS). SAR/GMTI and EO/IR/LD are payloads found on current UASs with plans to be incorporated on to the future Fire Scout, which RUS manages.

Currently housed on the Warrior Alpha is the Lynx I, a SAR/GMTI payload supporting current operations to satisfy a quick-reaction response for our warfighters. STARLite, the SAR/GMTI program of record (POR) production system, will be integrated and fielded in all 10 Army divisions with the Sky

Warrior Block 1 and the Fire Scout Class IV Future Combat Systems (FCS). These payloads offer two important capabilities to our warfighting decision makers.

In the GMTI mode, “the radar senses and tracks moving targets on the ground,” said LTC Terrence Howard, PdM RUS. As an example, he explained that, “If you have a series of vehicles on the ground, [GMTI] tracks the movement of those targets. Although you cannot positively identify those moving targets, this capability allows for situational awareness [SA] of movement that might be of importance to operations. These systems are especially important on poor visibility days when camera technology does not work as well.”

Assisting GMTI in providing an identification of a target is the responsibility of the SAR portion of the payload. “Think of SAR as a single map developed from smaller strip pictures,” explained Howard. “SAR takes a picture of a strip of land and the next

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strip of land and then the next strip of land, tying those strips together to provide a 2-D map of the area of interest. If there is a tank or a truck or something in those strips, the analysis can detect that.”

The payload has the flexibility to switch back and forth during a mission between

the two capabilities depending on the information needed. The combination of STARLite, Lynx I, and another RUS payload—EO/IR/LD—allows the UAS to be an all-in-one tool for conducting intelligence, surveillance, and reconnaissance (ISR) missions.

The Common Sensor Payload (CSP), the next version of EO/IR/LD, is the primary payload for all Army UAVs.

“Typically, you are going to cue an EO/IR because you can’t fire on anything without positive identification,” said Howard. The EO portion provides a picture of the area being surveyed by a UAS and the LD gives the UAV the ability to point at a target for the direction of weapons. “Every [UAS] mission is an EO/IR/LD because not only does CSP provide them with the contents for the reconnaissance piece, it also provides a targeting element that is reconnaissance, surveillance, and target acquisition [RSTA],” noted Howard.

CSP offers a broad spectrum of coverage for commanders and analysts with options that include color and black and white TV, image intensified TV, and midwave forward-looking infrared sensors. The CSP and STARLite have both been accepted for the Sky Warrior and will replace the Lynx II and EO/IR/LD.

TSP

Another capability in great demand from the field is SIGINT. The TSP payload, which is slated to reside on the Sky Warrior UAS, will offer an amplified amount of SIGINT coverage to the field. Complementing the existing SIGINT assets currently available, this POR, which used to be a part of PdM Prophet, is managed by PM Aerial Common Sensors.

Regarding the history of the program, Mike Schwartz, Assistant PdM TSP, said, “We were on the MH-60 Black Hawk helicopter and then we went to the Hunter/Fire Scout and now we have a requirement for the Extended Range Multipurpose UAS as that is becoming the new UAS of choice for the Army.” Schwartz continued,

“TSP will provide the warfighter with enhanced SA, emitter mapping, target identification, and electronic intelligence preparation of the battlefield. Our big thing is emitter mapping, but TSP provides so much more. It is more than just a map; it’s all the identification behind the signals it is collecting.”

TSP locates emitters on the battlefield and provides that data to a map so that a warfighter or commander can see where these emitters are on the battlefield. “Putting SIGINT on UASs is going to be a big step forward for the Army in terms of adding to the collection and data information that decision makers can get right now,” added Schwartz.

BETSS-C

Another capability that PEO IEW&S provides to warfighters is the BETSS-C system. Managed by PM NightVision/RSTA, BETSS-C is currently being fielded to units in the field. The goal of BETSS-C is to rapidly provide the warfighter with a flexible, mobile, adjustable, scalable, and expeditionary surveillance system or integrated system-of-systems for standoff surveillance and persistent ground-targeting capability and force-protection operations.

BETSS-C serves as a sensor data management architecture that provides information to the intelligence and operations communities. With respect to DCGS-A and UASs, BETSS-C will provide another path for full-motion video (FMV)/imagery ingestion from UASs into the DCGS-A, with further FMV/imagery availability for other intelligence platforms.

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DCGS-A

Analyzing and making use of the various types of information that SAR/GMTI, EO/IR/LD, TSP, and BETSS-C currently provide or will provide in the future falls into the world of DCGS-A. “All roads lead to DCGS,” said LTC Daniel Cunningham, PdM ISR/RSTA Operations DCGS-A. DCGS-A is the Army’s ground portion of the Joint Intelligence Enterprise, unifying the collection, processing, analysis extraction, query, and visualization capabilities for tactical environments. This unification is accomplished by fusing the technology of nine existing intelligence systems into one net-centric enterprise capability.

DCGS-A users receive UAS data from other DCGS systems in the enterprise via metadata. The system can receive UAS data using tactical communications. Version 4 of the system will have access to FMV and other direct sensor feeds.

Images or signals relayed from a UAS are available to DCGS-A analysts in near-real-time—“essentially as fast as the sensor can send the data to the ground receiver,” said Cunningham. As new payloads are incorporated on future UASs such as TSP and EO/IR, DCGS-A should not be required to add new sensor processing capabilities unless the UAS is carrying a new and unique sensor.

PEO IEW&S will continue to provide proactive support to meet the challenges and demands from the UAS community as America’s eyes in the sky continue to evolve.

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