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MT2

July 2010
Volume 15, Issue 4

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LCS Bridge Training Systems * Distance Learning * UAS Training
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seamlessly transition displays and control interfaces created for the tactical UAV into the training solution for the same vehicle,” said Scott Ariotti, director of Sales & Marketing at DiSTI. “This availability vastly streamlines the development and training process for these unmanned vehicles.”

Emerging developments within the embedded industry have allowed for expanded use of DiSTI products and services for UAV applications. For example, Ariotti said DiSTI now supports OpenGL ES 1.1 and 2.0 for its HMI toolkit, GL Studio. This capability enables access to the Apple iDevices (iPod, iPhone, iPad). Now, by using GL Studio’s Safety Critical Embedded C++ code generator, users can deploy GL Studio applications on the iPhone, iPod or iPad. For the unmanned vehicle industry, this translates into portable capability for ground station repeaters and remote control.



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ahead of the aircraft.”

Probably the biggest trend for UAS training is the growing reliance on virtual simulation for operator training. “Because of the restrictions associated with operating UAVs in the national airspace, training organizations are increasingly turning to virtual simulation to establish initial operator qualification and to maintain currency for qualified operators,” said Beilstein. “Just as the Army’s helicopter flight training school has recognized that simulation is a safer and more cost-effective supplement to live flight training, UAS organizations are now also embracing virtual training.”

AEgis’s goal with VAMPIRE is to replicate live training as closely as possible, so the company is developing several new training enhancements that will match the new DDL capabilities that the Army is fielding for its Raven UAS. This new functionality will allow Raven operators to train “relay” operations where one UAV serves as a communications relay for others, extending the effective range of the sensor significantly. ★

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EMBEDDED TRAINING

Through collaboration with AeroVironment Incorporated, AEGIS developed and delivered a mission planning and operator training capability for the Raven, Puma and Wasp UASs. VAMPIRE (Visualization and Mission Planning Integrated Rehearsal Environment) is an embedded training capability that is 100 percent hosted on the fielded UAS equipment (e.g., no additional hardware requirements) and allows operators to train and rehearse operator and mission-level tasks for each system.

Closely integrated with the FalconView flight planning software currently used by Army UAS operators, VAMPIRE simulates operator tasks such as route and mission planning, as well as in-flight tasks such as target tracking and reaction to emergency procedures. “AEGIS’ scenario generation capability will also allow users to build tactical scenarios on geospecific terrain databases built from satellite source imagery,” said Del Beilstein, director of Business Development for Army Programs at AEGIS. “Using a large library of realistic 3-D models (humans, vehicles, weapons and aircraft), custom special effects (smoke, explosions, fire, etc.), accurate celestial modeling, and user-selected light and weather conditions (including IR simulation), VAMPIRE provides critical training capabilities that are always available to the warfighter regardless of existing weather, airspace or tactical limitations.”

AEgis does not have any subcontractors associated with VAMPIRE or UAS training solutions. All software is developed by AEGIS employees working in collaboration with the Raven OEM, AeroVironment.

The transition to digital data link (DDL) will allow video feeds from UAS to be accessed by any warfighter that wants them—from virtually any location on the battlefield.

“Manned/unmanned teaming and sensor-shooter linkage is only the beginning with this kind of capability, and tactics will continue to evolve that allow soldiers to take advantage of it. But with those capabilities come increasingly complex training requirements to teach UAS operators to work in collective, collaborative environments with Army pilots, ground units and even joint entities,” said Beilstein. “It’s critical for training systems to provide tactical scenarios to enhance operator decision-making in addition to standard operator-level tasks. Just like a pilot learning to fly a helicopter, the operator has to learn to think

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There are hundreds of initiatives utilizing UAS. Some of the most significant include the use of munitions on aircraft that have historically been for imagery purposes only and manned-unmanned platform (MUM) teaming. A big trend for UAS training is the growing reliance on virtual simulation for operator training.

L-3 Link Simulation & Training is delivering the Predator Mission Aircrew Training System (PMATS) to the U.S. Air Force. The firm has delivered 18 PMATS to date and will deliver 25 systems by February 2011.

PMATS is the primary crew training device for the MQ-1 Predator and MQ-9 Reaper. "It is a high-fidelity simulator that uses an actual ground control station [GCS] that is integrated with L-3 Link's simulation software and visual system databases to create a fully immersive environment," said Lenny Genna, L-3 Link Simulation & Training's vice president for Rotary Wing, Unmanned Aerial and Ground Training Systems. "PMATS simulates aircraft performance, in addition to weapons, sensors and datalink operations. Environmental conditions are also realistically simulated."

In addition to the GCS, each PMATS unit consists of an instructor operator station, multifunction work station and a local area network (LAN). Users also normally receive a brief/debrief station.

L-3 Link has one key subcontractor for PMATS—General Atomics Aeronautical Systems Inc. They are the prime contractor for the MQ-1 and MQ-9 platforms, said Genna. General Atomics provides the GCS and platform software loads used to build the training device and properly simulate aircraft and subsystem performance.

The training environment closely replicates that used in live operations. "The synthetic environment uses a unique physics-based environment generator to portray complex and realistic urban environments. Training scenarios are developed with actual U.S. Air Force UAS operators. The databases represent current training and opera-



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tional geographic areas," said Genna. "The PMATS—which simulates all onboard sensor, weapons and communications systems—has the capability to induce real emergencies, degraded video feeds and environmental conditions that will likely be encountered in real-world operation."

PMATS is currently networked, via an organic LAN, with other PMATS devices to support multi-ship training.

"There will be continued emphasis on sensor operations and improvement of the training environment. Rapid integration of new payloads and sensors will be critical to simulate future mission environments," Genna concluded. "Continued improvements will be made to the training environment and sensor/targeting systems."

COTS SOFTWARE

Presagis does not work directly on DoD UAS training systems. They develop and deliver commercial off-the-shelf software to customers, including BAE Systems, Northrop Grumman and Simlat. These organizations use their tools in the development of department training applications.

For example, Northrop Grumman's Cyber Warfare Integration Network leverages COTS tools from Presagis to generate advanced, physics-based simulations of high- and low-altitude scenarios, detailed urban environments and sensors that track weather effects, heat sources and radar reflectors. "The integrated scenarios enable Northrop to train operators to analyze the visual output of the unmanned aerial vehicle sensors (such as night vision and infrared sensors), as well as fly the aircraft through a multitude of scenarios," said Nick Giannias, vice president, Research & Technology at Presagis.

The primary focus of UAS training is on fidelity and realism. For example, Giannias said it is critical that simulated ground stations be indistinguishable from the real thing so that the training experience

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