

Integrated Live-Virtual-Constructive (iLVC) Training



Overview

In November 2017, CAE and Rockwell Collins announced the two companies had established a collaborative agreement to develop integrated Live, Virtual, Constructive (iLVC) training solutions. The two companies also conducted a joint demonstration of an integrated mission training exercise using fully connected and integrated LVC training elements during the annual Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), which is the world's largest military training and simulation event.

The Participants/Players

The live, real-time LVC training exercise demonstrated at I/ITSEC represented a joint (air, land, naval), multi-dimensional mission training environment. There were numerous virtual and constructive entities that took part in the exercise along with a live LVC-enabled L-29 aircraft with Rockwell Collins avionics that was flown in Iowa and operated by the University of Iowa's Operator Performance Laboratory (OPL). The table below highlights the main players in the integrated LVC mission training scenario.

Live

Entity	Call Sign	
L-29 aircraft (simulating F/A-18 fighter)	Hawk 21	Rockwell Collins

Virtual

Entity	Call Sign	
Naval Combat System Simulators (simulating Visby class corvette vessels)	Kilo 1 Lima	CAE
F/A-18 part-task trainers (total of two)	Beaver 33 & Beaver 34	Rockwell Collins
Remotely piloted aircraft (RPA) desktop trainer	Shadow 7	CAE
E-2 Hawkeye operator console	Bluetail 61	Rockwell Collins

Constructive

Entity	Call Sign	
Apache helicopters	Tiger 1 & Tiger 2	CAE*
MiG Fighters	N/A – Hostile Forces	
Surface-to-Air Missile (SAM) Site	N/A – Hostile Forces	
Various constructive entities/players	Trucks, Armoured Fighting Vehicles, Personnel	

* constructive entities generated using CAE's STRIVE computer-generated forces software

The Scenario and Mission

The mission training exercise involved both air-to-air and air-to-ground scenarios, followed by a battle damage assessment. For the air-to-air scenario, coalition forces arrived ahead of the main battle group to investigate surface-to-air-missile (SAM) sites that were engaging the coalition as they tried to establish a forward operating base. A remotely piloted aircraft (RPA) provided surveillance of potential areas of interest while the E-2 Hawkeye provided overall command and control. The Visby class corvette vessel was tracking maritime traffic as well as updating the electronic warfare picture for the air assets. Three F/A-18 fighters (two virtual, one live) were ready for tasking. The coalition forces were then tasked to engage MIG29 enemy aircraft.

For the air-to-ground scenario, the RPA identified a hostile SAM site and coordinated with the E-2 Hawkeye, which then directed coalition forces to attack the SAM site. F/A-18 fighters and the Visby class corvette engaged the enemy SAM site to remove the threat. Following the attack, the RPA and AH-64D Apache helicopters performed battle damage assessment.

The overall mission training exercise was led by a white force mission commander from CAE who managed the scenario. All asset information was routed through a Rockwell Collins multiple level security system and controlled by Rockwell Collins.

Key Messages/Benefits

CAE and Rockwell Collins both firmly believe that integrated live, virtual, constructive training is becoming more critical as defense forces look to cost-effectively improve mission readiness. We have focused our joint development efforts on several areas that have been identified by military customers as critical to enabling more efficient and effective use of iLVC training.

- Seamless and interoperable leveraging open industry standards
- Cybersecurity and secure integration
- Common and correlated synthetic environments
- Tools that facilitate the set-up, management and execution of LVC exercises



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