

Modernize the System: Modernize the Training

The changing threat environment has prompted modernization of air defense systems and their associated training systems. *Chuck Weirauch* reports.

Air Defense Artillery School students at Fort Sill conduct Stinger training exercises in the Improved Moving Target Simulator dome.

Image credit: U.S. Army/Marie Berbera.

Air threats to ground based assets are arising in unexpected places, and from new sources. It's a dynamic environment and in light of this situation, the US Army is modernizing its air defense systems with an emphasis on upgrades of current systems and the networking of air defense assets.

Patriot

Designed for long-range air defense against ballistic missiles, cruise missiles and aircraft, the 1980's-era Patriot system has undergone incremental upgrades over the years; however, in 2012 the first complete, new-production Patriot system was introduced by prime contractor Raytheon and is now being deployed. The US Army recently announced that it plans to continue its employment of the Patriot system through the year 2040. Eleven other countries incorporate Patriot into their air defense systems, with 205 Patriot units deployed globally.

According to Ralph Acaba, Raytheon Director of Patriot Systems, the company has made a significant investment, more than \$400 million, over the past three to four years to modernize the Patriot system. The modernization to improve the system's capability includes the replacement of analog processors and software with digital processors, operator touch panel user interfaces; maintenance advances and the new GEM-T missile. The new system has gained Army approval and is now in production.

"Along with the new system, we have also made an effort to modernize the training for it," Acaba said. "We are preparing the Patriot system for the next 30 years and the growing demand

for our customers to meet the evolving threat. Our goal is to maximize commonality both for the operational systems and the training products."

According to Scott Gavin, Raytheon Lead for Patriot Training Devices, the Patriot modernization effort has allowed training products to evolve in ways such as in mobility, the downsizing of the trainers and running operational system software. Prior to modernization, Patriot trainers required very large classrooms and consoles, but now they can be much more compact and deployable, he said.

The latest product of the Patriot modernization effort is the Reconfigurable Tabletop Trainer (RT-3) mobile training platform. The RT-3 is a PC-based training system that simulates Patriot missile system operations and features two 30-inch simulated touch screens and operating system displays, including that of a Patriot radar screen. It provides simulations of Patriot tactical displays, controls, indicators and manned stations and can train multiple air battle crews simultaneously. The RT-3 has been fielded to a number of deployed Patriot units and

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is also employed at the Army's initial Patriot system schoolhouse, the Training and Doctrine Command (TRADOC)'s Air Defense Artillery School at Fort Still, OK.

"The RT-3 allows us to run different applications, and we can do operational and maintenance training with this new trainer at the fielded sites," Gavin said. "Patriot crews can use this trainer when they are in the Patriot shelter and can incorporate changes on the tactical side, using a subset of the Patriot operational software. Employing this software in the RT-3 eliminates the time gap of integrating tactical or system updates or changes into the trainer."

Raytheon is also developing a new training capability tied to the RT-3 platform to provide distributed training lessons and exercises from the schoolhouse to fielded units worldwide, Gavin reported. Although the Army has not yet indicated a requirement for this capability, it fits into the service's air defense modernization plans for networked operations, which could call for networked training as well.

"This is also an opportunity for the Army to expand the use of the RT-3 units worldwide as the service goes to a more integrated air missile defense system," Gavin said. "They are going to have to figure out how to train this way as well. Having a platform that can do distributed simulation and training may be where the Army may be headed in the future."

While the RT-3 has the capability to provide maintenance training, Raytheon is focusing on game-based training systems as well. Training systems subcontractor Heartwood has developed a Patriot Multi-Echelon Training System leveraging a virtual environment.

"We created a virtual 3D simulation environment with a gaming software application for our Radar ACS and launcher models for multiple levels of maintenance, with more involved tasks and more skill sets, Gavin said. "We can have this capability out with fielded units, and can get any changes into the environment at the schoolhouse before the operator actually sees it in the hardware."

SHORAD Systems

As with the Patriot system for long-range air defense, the US Army is primarily



Staff Sgt. Jessica Ray sights in a stinger missile on virtual enemy aircraft. Image credit: James Brabeneo/Fires Center of Excellence, Fort Sill.

depending on updates to systems that were developed and fielded in the early 1980's for short-range air defense (SHORAD). These include the man-portable (MANPAD) Stinger and the vehicle-mounted Avenger system that consists of a 50-caliber machine gun and a pedestal-mounted Stinger missile rack.

A more recent addition is the mobile Improved Sentinel phased-array radar. The Counter Rocket, Artillery and Mortar (C-RAM) Centurion system, a Gatling gun land-based variant of the shipboard Phalanx Close-In Weapons System (CWIS), was first deployed in 2005 to protect forward US operating bases in Iraq and subsequently those in Afghanistan. The Centurion is trailer-based and has its own radar to allow it to operate autonomously.

As with the Patriot system, all initial Army SHORAD training is currently conducted at the Air Defense Artillery School at Fort Sill, except for the C-RAM system. Advanced mission-based SHORAD training is provided at Combat Training Centers (CTCs) and when Air Defense Airspace Management (ADAMS) cells composed of SHORAD-trained and qualified soldiers are deployed to their units.

The 30th Air Defense Artillery Brigade at Fort Sill has the responsibility for the Air Defense Artillery School. The school provides initial instruction and courseware for two military career specialties, the Air Missile Defense Avenger Crewmember (14S) specialty and the Air Defense Battle Management System Operator (14G) specialty. The 14S soldiers operate Stinger and Avenger systems, while the 14G personnel operate the Sentinel radars and manage and

coordinate forward air defense control and communications. The ADA schoolhouse also conducts initial MANPADS Stinger courses and provides follow-on advanced courses, such as the Air Defense/Air Management course for ADAMS cell members on SHORAD command and control.

According to ADA School SHORAD training lead Lt. Col. Matthew Tedesco, both the 10-week 14S and 15-week 14G courses are comprised of classroom and virtual training. The 14S course culminates with a four-day live Warrior Field Training exercise for collective team training and live firing of the MP3 machine gun mounted on the Avenger. This occupational specialist group is expected to evolve into the one that will be involved in the C-RAM mission, Tedesco added.

Currently the ADA school employs seven Improved Moving Target Simulator (IMTS) in its 14S and MANPADS curricula. The IMTS projects battlefield background scenes and moving aircraft targets onto a 360-degree, 40-foot diameter hemispherical dome screen, creating a realistic battlefield environment. The virtual Avenger Skills Lab and the Conduct of Fire Trainer (COFT) are also employed in the 14S course, while the 14G curricula incorporates the Radar Control Terminal Simulator. The ADA schoolhouse is also expanding its Visual Aircraft Recognition Training, which Tedesco described as a computer-based cloud-type environment for study that also can be used by units in the field as a database resource.

"At the schoolhouse, right now 25