Integrating Brigade Combat Team Modernization

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As outlined in the recently released Brigade Combat Team (BCT) Modernization strategy, the Army has adopted new acquisition strategies to support the incremental modernization of its BCTs. Integrated capabilities will now be developed and fielded according to the Army Force Generation (ARFORGEN) Model, with the intent to support those BCTs that are deploying and need the capabilities the most. The BCT Modernization Plan, which is informed by the comprehensive lessons learned from 9 years of war, focuses on the evolving needs of our warfighters in a rapidly changing security environment and exploits the knowledge and technologies developed under the former Future Combat Systems (FCS) program.

A Soldier with the U.S. Army Evaluation Task Force prepares to investigate a tunnel with a Small Unmanned Ground Vehicle at White Sands Missile Range, NM. The tunnel is one element of a vast, operationally relevant test area constructed at the range to test the sensor and unmanned assets that make up Increment 1 of the Army Modernization strategy. (U.S. Army photo.)

Historically, the Army has made one modernization decision and then applied it across the force, often taking two decades or longer to implement it. In part, the FCS program followed this model, but incorporated systems engineering, initiated total system integration to ensure functionality across the BCT, and ensured that Soldiers were included in the test process. Today, the BCT Modernization Plan recognizes that decisions must be made incrementally to stay ahead of the demands of the security environment and meet warfighters' needs.

The Army's new plan allows flexibility to adapt while embracing lessons learned from the FCS program, including continuing the role of battle-tested Soldiers in the development of new equipment, and retaining systems engineering and integration as key components to ensure systems' interoperability. The strategy also will incorporate Mine Resistant Ambush Protected vehicles into BCT formations, accelerate the fielding of new Capability Packages across all BCTs, and initiate a combat vehicle modernization strategy with the Ground Combat Vehicle as a key element.

Incremental Capability Packages, developed and fielded on a 2-year cycle, are at the core of modernizing BCTs. The packages will support incremental fielding of the best technology available from the research and development base to meet the challenges of the current fight, while reflecting the continually evolving combat environment and leveraging knowledge gained during 9 years of war to develop future capabilities. Capability Packages will include doctrine, organization, and training in conjunction with materiel to fill the highest-priority shortfalls and mitigate risk for Soldiers. The incremental deliveries will build upon one another as the Army continually adapts and modernizes.

Emerging from systems engineering, test integration, and product development during more than a decade of FCS program management, Program Executive Office (PEO) Integration is now a key BCT Modernization organization charged with ensuring integration across the PEOs and their associated portfolios that support the Capability Package materiel solutions. System-of-systems engineering, integration, and testing will remain the responsibility of PEO Integration to support the Capability Package construct. As requirements are formulated, PEO Integration will fully integrate and test Capability Packages composed of vehicles, equipment, network elements, and supporting infrastructure to modernize BCTs in conjunction with the ARFORGEN model.

A Soldier equipped with a Common Controller conducts a pre-launch check of a Class 1 Unmanned Aerial Vehicle (UAV). The Common Controller consolidates control of numerous sensor nodes and unmanned systems, including the Class 1 UAV and the Small Unmanned Ground Vehicle, into a single integrated networked controller. (U.S. Army photo.)

Capabilities for Infantry First

Increment 1, managed by PEO Integration's Project Manager Infantry BCT (PM IBCT), will form the backbone of the first Capability Package, significantly improving the IBCT Soldier's knowledge of the battlefield and ability to communicate key situational awareness data across the BCT echelon. Increment 1 consists of the Small Unmanned Ground Vehicle, Class 1 Block 0 Unmanned Air Vehicle, Tactical and Urban Unattended Ground Sensors, and the Network Integration Kit (NIK), which receives and passes sensor data from the unmanned systems to the Soldier and provides a common operating picture of the battlefield.

"All the Increment 1 systems are networked to support sharing of detailed tactical and visual data across the entire IBCT," said COL John Wendel, PM IBCT, during recent Increment 1 test exercises. "They are able to leverage and improve existing current force networks."

The Army is in Year 3 of a 4-year test and evaluation process for Increment 1. This increment has successfully passed Preliminary Design Review and Critical Design Review. The current technologies have been certified as mature enough to begin low rate initial production (LRIP). The Increment 1 program is executing a robust Reliability Growth Program of the systems being tested. The rigorous testing focuses on evaluating hardware and software updates to the production representative systems; evaluating secure aspects of the network and connectivity in operationally relevant environments;

continuing the development of tactics, techniques, and procedures for hardware and network capabilities; and continuing to add to the reliability, availability, and maintainability test hours to support directed Increment 1 confidence levels.

The iterative "test-fix-test" strategy has allowed the program to continuously mature hardware models and software as it progresses through the development process, while leveraging valuable feedback from U.S. Army Evaluation Task Force (AETF) Soldiers to continue improving the systems. "By utilizing an integrate-test-fix strategy, the Army is not only addressing incident reports and enhancing capability; it is ensuring that fixes are made before the Soldier is issued the equipment in the field. So far, we've seen encouraging results in the 2010 test cycle," Wendel said.

In June 2010, the program conducted a series of high-tech network and equipment verification evaluations called technical tests. Data gathered from these tests will factor into network and product development improvements as the Army moves toward the final stages of evaluation. In September, Soldiers of the AETF completed a full-scale military exercise to test and evaluate Increment 1 during the Force Development Test and Experimentation and the limited user test (LUT). The LUT is a Soldier-driven independent review of maturity, readiness, and functionality. A successful LUT will pave the way for additional low-rate production of Increment 1 equipment after a Defense Acquisition Board review, which is scheduled for December 2010.

The 2010 Increment 1 testing focuses on network enhancements and hardware fixes to increase connectivity between Soldiers, ultimately providing increased intelligence, surveillance, and reconnaissance capabilities, as well as increased survivability and lethality. Many of the reliability, maintainability, and durability issues identified during the 2009 LUT have been addressed, and the testing and evaluation methods have been updated. By LUT 2010, the Army is expected to have rectified all of the fixes identified the previous year.

This year's testing also incorporates enhanced data collection methods, production representative equipment, and improved and expanded operationally relevant test ranges. "The tests continue to grow in complexity and density," Wendel explained. "Our systems are covering vastly expanded terrain as a result of significantly enhanced range performance of the Joint Tactical Radio Systems Ground Mobile Radios."

Additional evaluations are also taking place using Increment 1 capabilities to provide the backbone of the BCT network. In July 2010, the Army conducted a BCT Network Integration Exercise at White Sands Missile Range, NM. It was designed to help the Army formulate its tactical network strategy by seeking to prove the concept of an integrated tactical network available to Soldiers at all echelons of the BCT. Additionally, the exercise leveraged the Army's development of the NIK, as well as past integration initiatives to illustrate the ability to connect the Soldier to the company and, through the Warfighter Information Network-Tactical and Command Post of the Future, to the battalion and brigade network architectures.

Although the exercise was not a formal test, it was the first time the U.S. Army Acquisition Corps was able to bring all tactical network pieces together in an integrated fashion in an operationally relevant environment. Army leadership will use data from the exercise as a baseline for how the Army envisions communicating on the battlefield throughout the next 7 years and for the shape of the mature network in 2017.

Future Steps

LRIP for Increment 1 is underway, with one brigade combat set of equipment being produced and readied to support the initial operational test and evaluation (IOT&E) in 2011. The 3rd IBCT, 1st Armored Division (AD) will be the first Army BCT to receive the Increment 1 networked systems, starting in 2011. Using the Increment 1 equipment, the 3-1 AD will conduct the IOT&E in late FY11 to provide a valid assessment of system operational effectiveness and suitability, which will inform the decision to move to full-rate production of the capabilities.

Already, leaders of the 3rd IBCT are familiarizing themselves with the key capabilities that Increment 1 of Capability Package 11-12 will provide. "There's a very sophisticated digital network that will be fielded to this brigade, and it will represent the first time that the Army has fielded an integrated, digital network to an operational unit," said COL Chris Cavoli, Commander of the 3-1 AD, during recent field tests. "This is a pretty powerful responsibility for [the IBCT], and it's probably going to change a number of ways that we do business. It is going to be the job of this brigade to figure out how we are going to use this in a fight."

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