Armored Brigade Combat Team Modernization

by Marco J. Barrera, SFC John A. Roberson and SGM (Retired) Carl Johnson

The Army's armored brigade combat team (ABCT) modernization efforts take a holistic approach that address and integrate all domains of doctrine, organization, training, materiel, leader development, personnel, facilities and policies (DOTMLPF-P). The Army Capability Manager-Armored Brigade Combat Team and Reconnaissance (ACM-ABCT & Recon) is the Army's lead to represent the user and conduct DOTMLPF-P integration of the formation.

We will discuss in this article the significant formation modernization efforts during the past year that include conducting ABCT unit visits, publishing operational and organizational (O&O) concepts, developing force-design updates (FDU) and designing and fielding materiel equipment, especially for the ABCT's fleet of vehicle platforms.

ABCT unit visits and organizational modernization

Formation modernization efforts begin with feedback from Soldiers and commanders in the field. ACM-ABCT & Recon routinely conducts unit visits with ABCTs and reconnaissance and security (R&S) organizations returning from deployments and major exercises to collect this user feedback. The ACM processes and organizes this feedback by DOTMLPF-P to identify trends and issues that can inform formation-modernization efforts.

This level of user feedback can influence Army-leadership-level resourcing decisions and shape O&O concepts for future formation designs.

Unit visits during the last year included 1st, 2nd and 3rd BCTs, 1st Cavalry Division; 1st and 2nd BCTs, 1st Infantry Division; 2nd BCT, 3rd Infantry Division; 3rd BCT, 4th Infantry Division; and 30th ABCT, North Carolina Army National Guard.

ACM-ABCT & Recon published O&O concepts last year for the ABCT and division R&S brigade. These O&Os describe how it is envisioned that these formations will fight in a multi-domain environment in 2028-2040 and how these formations are designed to do so.

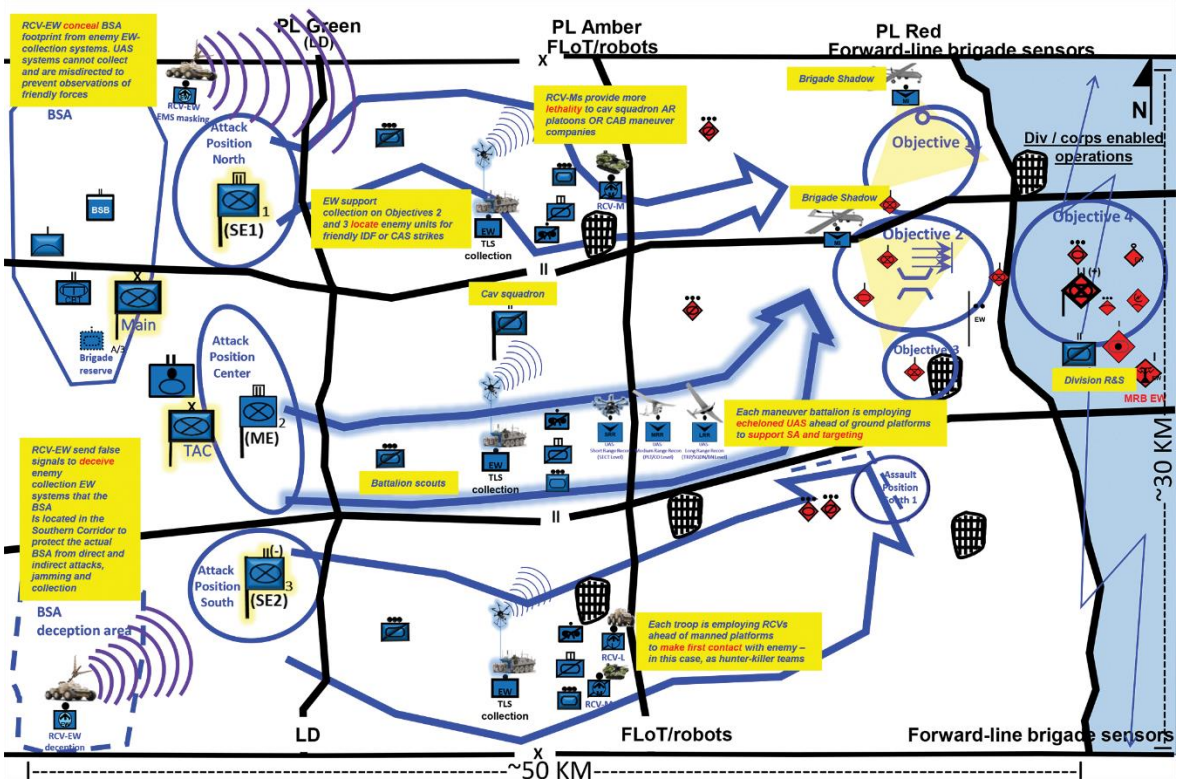

Figure 1. ABCT operational overview.

ACM-ABCT is currently developing the ABCT operational-mode-summary mission profile to define the next levels of detail for the ABCT O&O in terms of missions, conditions and a structured, quantitative picture of equipment usage for typical missions.

ACM-ABCT & Recon also continues formation-modernization efforts by developing FDUs to support Total Army Analysis (TAA) 25-29.

Proposed FDU changes within the ABCT redesign will apply to ABCTs impacted by the TAA 24-28 division-Cavalry pilot FDU as well as the preponderance of other ABCTs. The TAA 25-29 ABCT FDU's objective is to improve all ABCTs' ability to find, fix, close with and destroy peer and near-peer threats through the combination of mobility, precise lethal and overwhelming firepower, and devastating shock effect.

The ABCT redesign enables the division as the tactical unit of action, improves lethality in the BCT by building formations that incorporate new technology, and optimizes the formation for large-scale combat operations.

The current proposed ABCT redesign organizational structure includes the following:

- **ABCT organization.** In all cases, the ABCT will consist of three combined-arms battalions (CAB), an engineer battalion and a support battalion. ABCTs associated with the division-Cavalry pilot will have an organic, separate armored-Cavalry troop (ACT). All other ABCTs will retain their Cavalry squadron.
- **R&S.** The ABCTs operating in a division implementing the pilot armored-division Cavalry squadron will employ a robust ACT. ABCTs operating in a division without organic Cavalry maintain their ability to operate semi-independently in part by retaining their organic Cavalry squadron.
- **Robotic Combat Vehicles (RCVs).** The ABCT adds a RCV-Medium (RCV-M) company in one of the Armor CABs. The RCV company is a brigade asset that provides the commander with additional lethality, mobility, reconnaissance and electronic-warfare (EW) capabilities. Separate ACTs will also include an organic RCV platoon.
- **Brigade engineer battalion (BEB).** The BEB changes to two identical engineer companies (route-clearance platoons transition to the division) to increase the ABCT's mobility. The Army's approved FDU to establish an EW platoon in the military-intelligence company remains in the redesigned ABCT. The signal company remains unchanged.
- **Brigade-support battalion (BSB).** The BSB will adjust to support the redesigned ABCT, including adjusting mechanics for the new vehicle density and new requirements generated from the RCV-M company.

Division dependencies. Redesigned ABCTs will depend on the division to shape the deep fight with fires and by employing tables of organization and equipment or task-organized R&S security units. In the close fight, the ABCT will depend on the division to provide fires and a reconnaissance handover from the division's organic or task-organized unit to the ABCT's armored-Cavalry squadron or separate troop.

The ABCT will also require sustainment and protection support in the support area. Redesigned ABCTs will continue to depend on a division to provide capabilities to operate in the electromagnetic spectrum and information environment; with mobility and countermobility; in air defense and with aerial-maneuver capabilities.

Abrams modernization

Our current armored fleet, consisting mostly of M1A2 System Enhanced Package (SEP) v2 tanks, is starting to show its age. The remedy, fielding the brand-new SEPv3s, delivers a light technology refresh with huge focus on survivability and maintainability. Many of the SEPv3's improvements will be invisible to the Soldier, enabling a smooth transition that requires very little training from the SEPv2. The survivability upgrades to the armor, and repositioning of equipment within the turret and hull, are nearly unidentifiable – unless one is paying close attention to details such as crew seats suspended rather than mounted to the turret floor.

One of the biggest downfalls of the SEPv2 was fuel usage. A platoon of tanks sitting in observation or defensive positions can easily consume hundreds of gallons of fuel in a short amount of time. The SEPv3 alleviates this issue by way of the auxiliary power unit (APU). Running the APU enables the crew to shut down the engine and sit in a silent-watch mode, using power created by the APU and only consuming about one gallon of fuel per hour. This

improvement allows the tanks to remain on screening lines and in observation mode much longer than the SEPv2 could have ever hoped for, all without consistently draining battery power.

Along the lines of power generation, the SEPv3 also has a higher-amperage generator and improved slip ring. These components will create and pass considerably more amperage to the turret to power all current and future electronic upgrades.

The new SEPv3 vastly improves maintenance. The SEPv2 uses line-replaceable units (LRU), but the issue is that LRU failure means complete component failure. Entire failed units need to be removed, replaced or repaired at considerable cost and time. The SEPv3 replaces LRUs with line-replaceable modules. This improvement means that inside each main computer exists replaceable cards that drastically reduce complete component replacement time.

Figure 2. An Abrams SEPv3 is tested on the rugged road courses at Yuma Proving Ground, AZ, in 2018. *(U.S. Army photo)*

The improved vehicle diagnostics allow crews and maintainers the ability to identify which card inside the unit is causing the issue and simply swap out that card. No more removing the entire fire-control electronic unit, sending it off to be repaired and waiting for it to return. This has vastly improved mean-time-to-repair with lower operational costs.

A new loader's display unit improves ease of use by allowing crew access to interactive electronic technical manuals (IETMs). These IETMs ensure each crew never has to compete for limited numbers of paper technical manuals or look for missing pages that have fallen out of a binder. The IETMs will give crewmembers a digital interactive copy that can be used at any time without fear of losing critical pages of information.

Platform modernization

Combat platform modernization in ABCTs gained momentum last summer with attention-grabbing headlines from Fort Hood, TX, as the centerpiece of the formation. The M1A2 Abrams SEPv3 was fielded to the 2nd (Blackjack) and 3rd (Greywolf) Brigades of 1st Cavalry Division. ABCTs will continue this modernization progress in Fiscal Year (FY) 2022; first-units-equipped will get M2A4 Bradley Fighting Vehicles (BFVs) and Armored Multipurpose Vehicles (AMPVs).

The AMPV is designed to replace the legacy M113 family of vehicles and is the first new combat-tracked vehicle produced since the 1980s.

Behind the scenes, a number of other critical enabling systems continue their integration into the formation to increase situational awareness, fires lethality and freedom of maneuver, and to provide streamlined processes in sustainment and logistics. These systems are described, following.

M109A7 Self-Propelled Howitzer Paladin Integrated Management (PIM). The PIM modernization program is a significant improvement over the M109A6. First-unit-equipped occurred in 2017, and to date six ABCTs have taken delivery. While the 155mm cannon remains the same, this howitzer has a new chassis, engine, transmission, suspension and steering system. A 600-volt on-board power system accommodates emerging technologies and future requirements, as well as current requirements, including the network.

PIM is also engineered to increase crew force protection, improve readiness and vehicle survivability, and avoid repair-parts obsolescence. Maintenance and lifecycle costs are more affordable because PIM shares power train, suspension components and other systems with BFVs and the soon-to-be-fielded AMPV. Establishing component commonality among vehicles means increased availability and lower costs over time.

Figure 3. PIM on a test track. *(U.S. Army photo)*

AN/TPQ-53 Counterfire Target Acquisition Radar. PIM's response times and effectiveness are assisted and enabled by the AN/TPQ-53 counter-fire radar system (also known as the Q-53), which can detect, classify, track and determine the location of enemy indirect fire in 360- or 90-degree modes. Q-53 replaces legacy Firefinder AN/TPQ-36 and AN/TPQ-37 medium-range radars in the service inventory. When compared against the Q-36/37, the Q-53 demonstrates increased capabilities, including better mobility, increased reliability and supportability, lower lifecycle cost and reduced crew size.

The Q-53 can also perform multi-mission capabilities, having demonstrated the ability to identify and track unmanned aerial systems (UAS), while showing the capacity to conduct air surveillance simultaneously with counter-target acquisition, all in a single sensor.

Figure 4. The AN/TPQ-53 is a C-130-transportable, truck-mounted counter-target-acquisition radar system configured to provide 360-degree threat-detection capability. It is able to locate the firing positions of both rocket and mortar launchers. The Q-53 requires a four- or five-man crew and includes a 60-kilowatt transportable generator and one support-shelter vehicle. Q-53 uses an encrypted wireless network able to reach up to 1,000 meters away. *(U.S. Army photo by Kristen Kushiyama)*

Fielding to ABCTs has been ongoing since 2018 and should be complete in 2023.

M1074 Joint Assault Bridge (JAB) system. JAB provides ABCT engineer battalions with a survivable, deployable and sustainable heavy-assault-bridging asset capable of wet- or dry-gap crossing to enable better freedom of maneuver. First-unit-equipped is scheduled for 3rd Quarter FY21 at Fort Riley, KS.

JAB is a legacy (M1A1) Abrams tank chassis with a heavy (M1A2) suspension paired with a new hydraulic bridge-launcher system to deploy the existing Armored Vehicle Launched Bridge. It has improved launch and retrieval times (spans an 11-meter gap in about three minutes), which minimizes the crew's exposure to hostile fire and improves the maneuver element's ability to rapidly overcome mobility obstacles.

The JAB is projected to reduce maintenance costs and increase availability due to the commonality of parts with the Abrams chassis.

Figure 5. U.S. Soldiers assigned to 1st Battalion, 63rd Armored Regiment, 2nd Brigade Combat Team, 1st Infantry Division, move to assault an objective with a JAB during Decisive Action Rotation 17-06 at the National Training

Center, Fort Irwin, CA, May 7, 2017. *(U.S. Army photo by SPC Dana Clarke, Operations Group, National Training Center)*

Next-Generation Automatic Test System (NGATS). NGATS is a reconfigurable, general-purpose, automatic test system designed to provide sustainment support to Army weapon systems. Increment 1 replaces the Direct Support Electrical System Test Set and supports weapons systems in the ABCT.

Test program sets (TPS) for Abrams, Bradley and other systems will be rehosted to NGATS with significant improvements. This testing platform will standardize and reduce the number of the Army's automatic test equipment (ATE) systems to a single modern tester and will improve weapon-system availability. NGATS enables a decrease in logistical support requirements for ATE systems and supported weapons systems, and increases affordability and supportability of ATE.

Figure 6. NGATS is a standalone test system contained and stored on two international standard 20-foot containers along with a 60-kilowatt generator. NGATS is a diagnostic test set used to troubleshoot LRUs in the field and is a mounted system that allows Army maintainers to fix-forward on the battlefield. *(U.S. Army Acquisition Support Center photo)*

Fiscal years								
	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22
NGATS	3/1 CD 155 ABCT 116 ABCT 1/1 AD	2/1 CD 3/1 AD 278 ABCT 1/1 ID	1/34 ABCT	3/4 ID 2/3 ID 2/1 AD APS-2.1 APS-4	30 ABCT 1/3 ID 1/1 CD APS-2.2		2/1 ID	

Table 1. NGATS completed and remaining fielding schedule.

Army ATE cost savings with NGATS:

- Replaces older, obsolete field- and depot-level ATE;
- Uses common Defense Department architecture;
- Employs modern TPS development tools and reuses existing TPS; and
- Reduces test times.

Weapon-systems-platform cost savings:

- Transitions from original equipment manufacturer to organic maintenance; and
- Reduces Soldier training.

Soldier-Borne Sensor (SBS). SBS is a compact situational-awareness tool that can provide real-time visual-sector scanning for infantry and scout squads. The sensor provides the squad with an organic, "quick look" capability for near-real-time video feeds of larger, complex and restrictive environments during day, night and reduced-visibility conditions.

SBS is pocket-sized and extremely lightweight, nearly silent, has a flight time up to 25 minutes and a range of ~1.5 kilometers. It transmits live-video and high-definition still images back to the operator. Its information feed provides Soldiers with immediate situational awareness to help them perform missions safely and more effectively.

SBS is designed to be operated by Soldiers of any military-occupation specialty and requires no formal training in clearing airspace and airspace management. There are no special storage requirements for SBS or its repair parts, but units will need to adhere to battery storage and hazardous-material marking for containers where batteries are stored.

Figure 7. A Soldier trains and certifies on an SBS at Schofield Barracks, HI, Sept. 3, 2020. The sensor enables Soldiers to deploy a microdrone to gain situational awareness and observe where a Soldier cannot physically reconnoiter. *(U.S. Army photo by SGT Thomas Calvert)*

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Acronym Quick-Scan

ABCT – armored brigade combat team
ACM-ABCT & Recon – Army Capability Manager-Armored Brigade Combat Team and Reconnaissance
ACT – armored cavalry troop
AMPV – Armored Multipurpose Vehicle
APU – auxiliary power unit
ATE – automatic test equipment
BCT – brigade combat team
BEB – brigade engineer battalion
BFV – Bradley Fighting Vehicle
BSA – brigade-support area
BSB – brigade-support battalion
CAB – combined-arms battalion
CAS – close air support
DOTMLPF-P – doctrine, organization, training, materiel, leader development, personnel, facilities and policies
EW – electronic warfare
FDU – force-design update
FLoT – forward-line-of-own-troops
FY – fiscal year
IDF – indirect fire
IETM – interactive electronic technical manual
JAB – Joint Assault Bridge
KM – kilometer
LD – line of departure
LRU – line-replaceable unit
MCDID – Maneuver Capabilities Development and Integration Directorate
NGATS – Next-Generation Automatic Test System
O&O – operational and organizational
PIM – Paladin Integrated Management
PL – phase line
R&S – reconnaissance and security
RCV – Robotic Combat Vehicle

RCV-L – Robotic Combat Vehicle-Light
RCV-M – Robotic Combat Vehicle-Medium
SA – situational awareness
SBS – Soldier-Borne Sensor
SEP – System Enhanced Package
TAA – Total Army Analysis
TAC – tactical command post
TCM – (U.S. Army) Training and Doctrine Command capability manager
TPS – test program set
UAS – unmanned aerial system
USAARMS – U.S. Army Armor School