XM1069 Advanced Multipurpose Munition Concept Is a 'Game Changer'

by Steven A. Peralta and Jeffrey McNaboe

In today's operating environment, the Abrams main battle tank is a precise and lethal direct-fire platform employed against the wide variety of target types associated with the hybrid threat. To effectively engage the multiple targets inherent in such an operational environment, the Abrams has four direct-fire weapon systems. The primary weapon is the Abram's 120mm smoothbore cannon, which uses a variety of precision 120mm rounds capable of destroying targets ranging from armored vehicles and hardened positions to obstacles and personnel. The Abrams also mounts .50-caliber and 7.62mm machineguns able to dispatch light-skinned vehicles and dismounted enemies as needed.[1]

While tanks have long enjoyed the capability of destroying a variety of target types, the continuous evolution of the hybrid threat, coupled with increased risk posed by the ever-present "battlecarry dilemma," has brought about the need to further improve the Abrams' main-gun ammunition capabilities in the interest of maintaining lethal overmatch.

"Battlecarry" is an approach in which tankers determine what type of round to chamber in anticipation of the next engagement. U.S. tank doctrine dictates that the commander will determine the type of round battlecarried based on his mission and assessment of the threat. The tank commander determines the most likely target in a given tactical situation and loads the appropriate round, thereby enabling the gunner to engage anticipated targets in the shortest period.

When the next target presenting itself is not the one anticipated, this creates a battlecarry dilemma. For example, if the crew is battlecarrying a canister round (anti-personnel) and a non-personnel threat appears, such as a lightly armored vehicle, the commander must decide whether to dechamber the round or fire it to chamber the appropriate round. The additional time required to either fire or extract the chambered round, followed by reloading the main gun and engaging the target, puts the crew at a much higher risk of being first engaged by the enemy.

The Army is developing a fix to this, however: the XM1069 advanced multipurpose munition. The AMP round will mitigate the battlecarry dilemma by providing the crew with a single munition that can be chambered and fired effectively to defeat multiple target types.

Specific capability gaps that have emerged on the hybrid battlefield stem from engagement scenarios that existing ammunition will never support. There are two threats in particular that cannot be effectively defeated when firing currently stockpiled tank main-gun ammunition: enemy anti-tank guided-missile teams (this also includes dismounted personnel in the open at extended ranges) and the urban wall breach.

The M1028 canister round, designed to defeat a dismounted threat in the open, has a very limited range. This often leaves platform-mounted machineguns as the preferred option, even though they too have limited range and effect.

Also, in support of infantry, it is critical that the Abrams be capable of enabling dismounts to breach (enter) buildings or compounds. A successful breach allows a Soldier to pass through without any loss of momentum ready to engage any threat with his assigned weapon. This requires the need for a very precise warhead effect that can open a sizeable entry point while minimizing impact to the surrounding area. Current stockpiled munitions cannot meet this breaching requirement because they use shaped-charge warheads that were optimized for penetration at the expense of effectively creating a large opening in reinforced walls.

An additional and important concern associated with both shaped-charge and canister-munition usage in hybrid operational environments is collateral damage. The significant penetration capability of shaped-charge munitions increases risk associated with effects behind the intended target, while the muzzle-action nature of a canister cartridge increases risk associated with effects in front of the target.

In the past, the tank force adapted to new threats by developing new rounds specifically designed to defeat the new or emerging threat. Not only has this approach created an increased logistical footprint, it has also dramatically increased the risk to our tank force. AMP will change this approach.

COL Paul Laughlin, the 47th Chief of Armor and former commandant of the Armor School at the Maneuver Center of Excellence, Fort Benning, GA, recently captured the essence of what every Abrams crewman knows when he said, "The new AMP round is long overdue. Tankers have struggled for years with a growing number of main-gun rounds capable of defeating single types of threats; this resulted in a mix of ammunition types carried on board the tank that was always a problem. This is not just an issue of logistics; it creates both operational and survival issues. No one wants to get into a tank engagement and not have the right ammunition to defeat the range of threats that we will see on the future battlefield. The AMP round is a game changer that greatly increases our effectiveness. We need to make a very modest

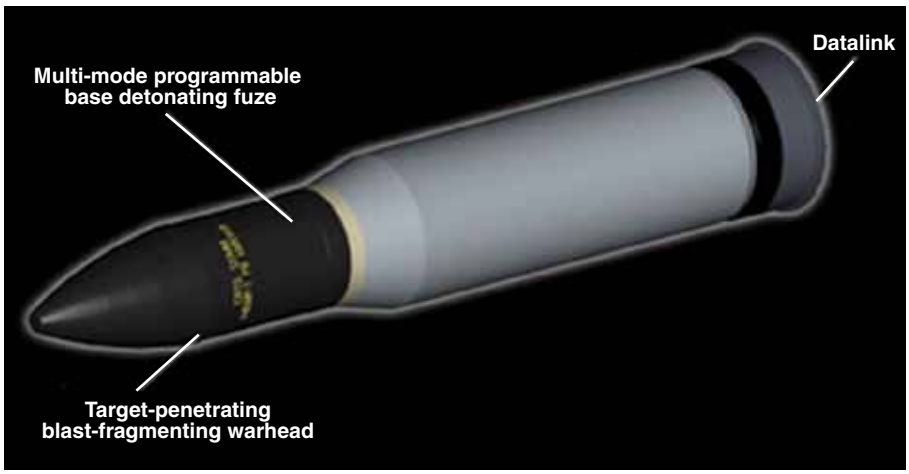

Figure 1. XM1069 AMP munition concept. *(Photo illustration by Stewart Gilman, ARDEC)*

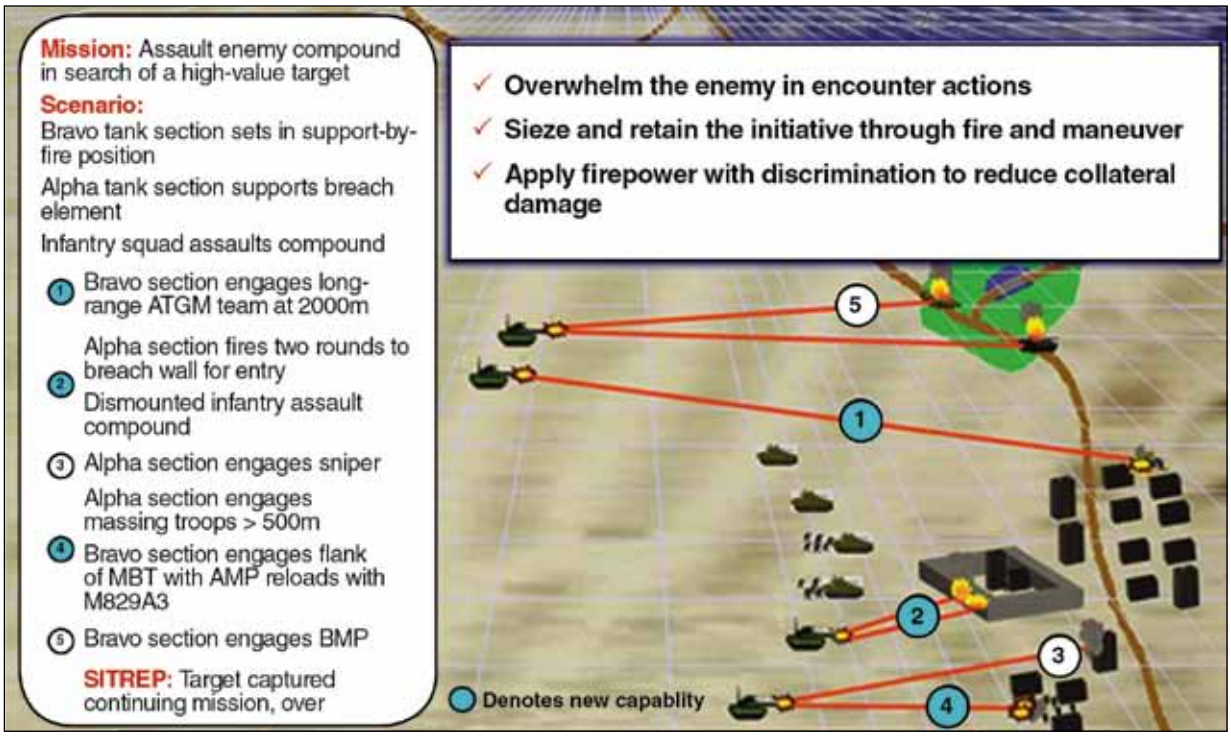

Figure 2. Operational vignette of AMP target sets. *(Vignette by Maneuver Center of Excellence's Mounted Requirements Division)*

and affordable investment, spread over 30 years, to field a highly versatile and reliable round with the capabilities we will need for any future fight."

AMP is a full bore, multipurpose munition designed to combine and improve the capabilities of four current 120mm munitions: the M830 (high-explosive anti-tank), M830A1 (multipurpose high-explosive anti-tank), M908 (obstacle reduction) and M1028 (canister). With a platform ammunition data link, the tanker will use the fire-control system to program the AMP fuze for one of three modes of operation: point detonate, point-detonate delay or airburst. This ability to communicate with the round and specify mode based on the intended target offers significant versatility and efficiency to the tank crew.

Whether the target is a lightly armored vehicle requiring a point-detonate fuze setting, a bunker requiring a point-detonate-delay setting or an ATGM team requiring an airburst setting, the versatility provided by the 120mm AMP round results in an unprecedented single-munition capability for the Abrams platform. Another benefit brought by AMP is reduced collateral damage. The nature of the programmable fuze, combined with a non-shaped charge warhead and full-bore design that requires no sabot petals (eliminating dangers of flying petals against dismounts or civilian populace) means that effects are delivered on the target with great precision.

The AMP round's versatility in supporting infantry forces operating in urban environments and defeating ATGM teams at ranges of 50-2,000 meters with a precise and lethal airburst are essential capabilities needed to defeat future threats. Evidence of challenges associated with this emerging need to support urban operations was apparent during Operation Iraqi Freedom and Operation Enduring Freedom. Similarly, lessons-learned by the Israeli Defense Forces during the 2006 Israel-Hezbollah War revealed that Hezbollah fighters used ATGMs extensively to destroy Israeli tanks.

Hezbollah's use of swarming ATGMs and rocket-propelled grenades against Israeli tanks was both shrewd and inventive. Of the 114 IDF personnel killed during the war, 30 were tank crewmen. Out of the 400 tanks involved in the fighting in southern Lebanon, 48 were hit, 40 were damaged and 20 penetrated. It is believed that five Merkavas were destroyed. Clearly, Hezbollah has mastered the art of light infantry/ATGM tactics against heavy mechanized forces.[3]

Figure 2 is an operational vignette depicting various AMP target engagements in support of an enemy compound assault in search of a high-value target.

The U.S. Army debuted the AMP capability as an Armament Research Development and Engineering Center science-and-technology effort that ended in 2006 with a successful Technology Readiness Level 6 demonstration of the XM1069 line-of sight multipurpose munition. By combining the use of a full bore, 120mm munition, a multimode programmable fuze with three modes of operation and an associated ADL, ARDEC was able to demonstrate the AMP's capability against targets that included a reinforced wall, bunker, light armor, dismounts and an ATGM team.

AMP capability gaps were documented in a capabilities-development document and approved by the Joint Requirements Oversight Committee in 2008 following the successful completion of this S&T program. AMP is awaiting funding to enter into the en-

gineering and manufacturing-development phase of the acquisition lifecycle.

AMP provides the armored brigade combat team commander increased tactical flexibility to defeat threats the ABCT was previously incapable of, effectively engaging and supporting infantry breaching operations by opening entry points to support urban-clearing operations. Most importantly, the new AMP round improves Abrams tank and crew survivability by dramatically reducing, if not eliminating, the existing "battlecarry dilemma." By giving the Abrams versatility to operate across the range of military operations where mobile protected firepower is required, the ABCT will be a more lethal and more powerful formation than ever.

Forces with these capabilities will have the ability to overwhelm and defeat enemies, which the ABCT encounters with operational mobility, increased survivability and lethal firepower. The ABCT is invaluable during operations in any environment – including counterinsurgency, stability and security operations.[2] AMP will increase the synergy of the dismounted Soldier when operating in direct support of armor formations by providing the Abrams tank the capability for discreet direct-fire support with controlled effects, while at the same time reducing fratricide and collateral damage. The U.S. Army needs to make a modest investment to field a highly versatile and reliable round that delivers new capabilities, reduces the logistical footprint needed to support the armor formation and, most importantly, reduces the survival risk inherent in the "battlecarry dilemma." The American Soldier deserves no less!

Steven Peralta is a combat developer with Capabilities Development Integration Directorate's Mounted Requirements Division, Fort Benning. His previous assignments include combat developer, Fort Knox, KY, and Fort Benning; and training-systems developer, BAE, Minneapolis, MN. While in the military, he attended Master Gunner School. Mr. Peralta holds a bachelor's of arts degree from Saint Mary's University in business management.

Jeffrey McNaboe is AMP team leader with Project Manager-Maneuver Ammunition Systems, Picatinny Arsenal, NJ. He previously served as mid-range munitions team leader, PM-MAS. Mr. McNaboe holds a bachelor's of science degree from Rutgers University in mechanical engineering and a master's of science degree from Stevens Institute of Technology in mechanical engineering.

Notes

[1] Haight, David B. COL, Laughlin, Paul J. COL, and Bergner, Kyle F. CPT, "Armored Forces; Mobility, Protection and Precision Firepower Essential for Future," ***ARMOR***, November-December 2012.

[2] Ibid.

[3] Matthews, Matt M., "We Were Caught Unprepared: The 2006 Hezbollah-Israeli War," The Long War Series Occasional Paper 26, U.S. Army Combined Arms Center Press.

Acronym Quick-Scan

ABCT – armored brigade combat team
ADL – ammunition data link
ARDEC – Armament Research, Development and Engineering Center
AMP – advanced multipurpose
ATGM – anti-tank guided missile
IDF – Israeli Defense Forces
PM-MAS – Project Manager-Maneuver Ammunition Systems
S&T – science and technology

Figure 3. XM1069 AMP capabilities. *(Photos by Stewart Gilman, ARDEC)*