

Cannon Artillery – An Update on the Army’s Current and Future Munitions Programs

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This article’s purpose is to educate the greater Acquisition, Logistics and Technology Workforce about the status of current and future artillery cannon systems and munitions. The U.S. Army Training and Doctrine Command (TRADOC) Capability Manager-Cannon (TCM-Cannon) is a client-oriented Commanding General (CG) TRADOC agency that ensures the integration of warfighting requirement domains of doctrine, organization, training, materiel, leadership and education, personnel and facilities for all assigned systems. TCM-Cannon acts on behalf of the CG TRADOC on matters pertaining to chartered cannon artillery and munition systems.

Soldiers prepare to fire the new M777A1 LW155 Howitzer during operational testing at Twentynine Palms, CA. The M777A1 is used by both Army and USMC artillerymen. The new M777A1 is the first towed (digitized) cannon platform designed to fire PGMs. (U.S. Army photo.)

TCM-Cannon strives to provide reliable cannon platforms and munitions. Their primary objective is to ensure that the managed systems meet user requirements, are affordable for the Army and are delivered to Soldiers in a timely manner. Current managed programs follow.

Current Cannon Systems

M119A1/2 105mm Towed Howitzer

Status: FY05 Congressional Supplemental funding was received in June 2005. Efforts continue to stretch available M119A1/2 assets to meet Modular Force needs. As units move from reconstitution to reset, to the Modular Force structure or to a deployed status, their priority continues to increase. Assets are being allocated in accordance with this guidance. U.S. Army National Guard (ARNG) units are currently converting to the Modular Force. Some units are scheduled to convert from the M109A6 Paladin 155mm Self-Propelled Howitzer, M198 155mm Towed Howitzer or M270 Multiple Launch Rocket System before new production M119A2 Howitzers are available. Fort Sill, OK, and the U.S. Army Armament Research, Development and Engineering Center recently began concept exploration to digitize the M119A2 fleet with Towed Artillery Digitization. This will improve the systems' ability to meet Modular Force concepts and pave the way for the use of near and precision guided munitions.

M109A6 Paladin 155mm Self-Propelled Howitzer

Status: As units modularize out through 2008, all M109A5 Howitzers will be replaced with M109A6 Paladins/M992A2 Field Artillery Ammunition Support Vehicles (FAASVs). The Paladin is expected to be in the Army's inventory until 2050. Therefore, a national recapitalization

program is being implemented for the Paladin/FAASV. This program allows the Paladin/FAASV to be upgraded with the newest technologies, including Modular Artillery Charge System (MACS), Excalibur ammunition racks and the Paladin Digital Fire Control System, which allows the platform to fire Precision Guided Munitions (PGMs) and inductively set fuzes.

M198 155mm Towed Howitzer

Status: The M198 recently finished undergoing a breech modification to enable the system to fire our newest propellant, the MACS.

M102 105mm Towed Howitzer

Status: Currently there are 171 howitzers still in service in the ARNG. The M119A2 will replace this system over the next few years.

Future Cannon Systems

M777/M777A1 Lightweight 155mm Howitzer (LW155)

System: The LW155 will eventually replace all M198 Towed Howitzers in Stryker Brigade Combat Teams (SBCTs). This system will provide location, directional reference and digital communications with the Fire Direction Center. The M777 will provide

close and deep fire support, counter-fire and interdiction fires to support operations in both the Army and U.S. Marine Corps (USMC), and be rapidly deployable to any region and operable under any climatic conditions. The M777 will be the first towed (digitized) cannon platform designed to fire PGMs.

Status: Currently, there are 94 M777s being produced for the USMC. The Army has finalized fielding to the Army Field Artillery and Ordnance Schools. The Army finalized fielding to the SBCTs during the first quarter of FY07.

Non-Line-of-Sight Cannon (NLOS-C)

System: This system is a variant in the Future Combat Systems (FCS) Family-of-Systems. The NLOS-C uses a common chassis within the FCS Family of Vehicles and has similar interoperability, mobility and survivability characteristics. This program leverages the work done on the Crusader Program and will have similar advanced capabilities on its platform. The NLOS-C provides networked, extended range targeting and precision attack of point and area targets with a suite of munitions that include special purpose capabilities. The NLOS-C provides



Soldiers from A Battery, 3rd Battalion, 29th Field Artillery Regiment, 3rd BCT, 4th Infantry Division (4ID), fire their M109A6 Paladin 155mm Self-Propelled Howitzer during an operational mission in support of Operation Iraqi Freedom (OIF). (U.S. Army photo by SGT Jack Morse, 982nd Signal Co. (Combat Camera).)

sustained fires for close support and destructive fires for tactical standoff engagement. The system's primary purpose is to provide responsive fires in support of combat battalions and their subordinate units in concert with LOS, Beyond-LOS and NLOS external and Joint capabilities. The system provides flexible support through its ability to change effects round by round and mission by mission. These capabilities, combined with rapid response to calls for fire and rate of fire, provide a variety of effects on demand to the battlefield commander.

Status: The new fielding schedule is still being drafted, but overview briefings show the first initial operating capability will be in 2014, with full operational capability by 2017. The program will deliver 8 NLOS-Cs to the Army by 2008, and will field 18 platforms from 2010-2012. The test platform fired more than 2,000 rounds from January 2003 to March 2006. The program is also reviewing bids for its Large Caliber Ammunition Resupply requirements as the system will be resupplied without the crew handling the projectiles. This will be a monumental achievement in the artillery community as currently all ammunition is fed manually

into current platforms. Live fire testing of this system was conducted at Yuma Proving Ground (YPG), AZ, in November 2006.

Munitions

XM982 Excalibur

System: Excalibur is an extended range projectile that attacks high-payoff and dangerous targets in all weather and all terrain types to support the close fight, while minimizing collateral damage through concentrated lethality and increased precision. The Excalibur is Global Positioning System (GPS)-guided, making it the Field Artillery's fire-and-forget munition of choice. It provides the capability to attack personnel and soft skin vehicles, as well as reinforced bunkers at ranges exceeding current 155mm munitions capabilities.

Status: Advanced Early Fielding was approved by the Army Resource and Requirements Board in March 2005. Acceleration of Advanced Field Artillery Tactical Data System (AFATDS) software and a Portable Fuze Setter is also required. Successful firing of multiple

An M109A6 Paladin from the 3rd Battalion, 16th Field Artillery Regiment, 4ID, fires a high-explosive round downrange in support of coalition force maneuver units operating in Diyala Province during OIF. (U.S. Army photo by SSG William L. Davis, 982nd Signal Co. (Combat Camera).)



inert and live projectiles at YPG has validated a Circular Error Probable (CEP) of less than 10 meters at all ranges. Excalibur's maneuverability was also demonstrated by conducting a 15-degree offset shot and having the projectile impact approximately 7 meters from the target. A Front End Demonstration was conducted June 13-16, 2005, in conjunction with the Fire Support Test Directorate, to validate AFATDS software and Excalibur tactics, techniques and procedures (TTPs). Some minor deficiencies were found with the AFATDS software and revisions to the TTPs were suggested. Software issues were submitted to Raytheon and Program Manager AFATDS.

MACS

System: MACS uses a "build-a-charge" concept in which increments are identical to all others in the same lot designation, eliminating the need to dispose of unused increments. Unused increments are retained for future use. MACS consists of two propelling charges, the M231 and the M232, and associated packaging. It is compatible with all current and planned 155mm field artillery weapon systems.

Status: MACS is materiel released. The Project Manager Combat Ammunition



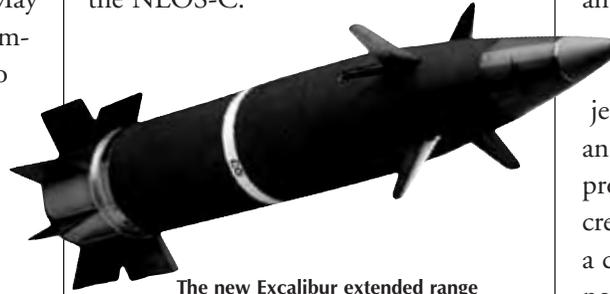
An M777 Howitzer provides close and deep fire support. This howitzer is used by both Army and USMC artillerymen and will become the first towed cannon platform to fire PGMs. (U.S. Army photo.)

Systems (PM CAS) began working to reformulate MACS to optimize MACS for the 39 caliber systems. The M232A1 was type classified 24 in May 2005 and materiel released in November 2006, but will not be released to cannon units until the AFATDS Block II software is released. The reformulated MACS will increase tube wear life and reduce blast-over pressure.

Multi-Option Fuze Artillery (MOFA) and the Portable Inductive Artillery Fuze Setter (PIAFS)

System: The M782 MOFA fuze is an inductively set fuze used with bursting projectiles. It has four functions: point detonating, delay, time and proximity. Due to its multiple options, the burden of tracking multiple fuzes in the logistics train is simplified. MOFA replaces eight fuzes currently in the inventory. The inductively set

fuze can be set with the PIAFS and is also compatible with automated ammunition handling equipment for the NLOS-C.



The new Excalibur extended range projectile will provide artillerymen with increased precision and concentrated lethality. (U.S. Army photo.)

Status: MOFA is currently in the production, fielding, deployment and operational support phase of the Life Cycle System Management Model. MOFA was type classified in September 1999 and was materiel released in November 2005. This fuze is for War Reserve only and will not be used for training.

Advanced Cannon Artillery Ammunition Program (ACAAP)

System: ACAAP is a product improvement program based on replenishing our current stockpile of 105mm and 155mm cannon artillery ammunition. The entire ACAAP suite of munitions has ballistic similitude or one set of firing tables for all projectile types. Additionally, ACAAP will provide the artillery cannoner the ability to change all rounds from Boat Tail to Base Bleed in the field.

Status: A Capability Production Document (CPD) for the 105mm Preformed Fragment projectile is currently being staffed. CPDs are currently being developed for the 105mm and 155mm family of munitions.

Projectile Guidance Kit (PGK)

System: PGK is a low-cost, fuze-sized module intended to replace a "NATO standard" fuze on conventional 105mm and 155mm ammunition.

GPS provides location and time during flight while an Inertial Navigation System (INS) determines trajectory and makes continuous corrections en route to the target. PGK reduces delivery errors by improving projectile accuracy with the aid of GPS and INS. PGK is being designed to provide approximately 30 meters (Increment 1) CEP at all ranges. PGK is a complementary system to Excalibur, not a competitor. PGK provides more efficient suppression versus Excalibur's point precision.

Status: Currently, the Army is leveraging Navy Guidance Integrated Fuze technology. The munitions industry is aggressively investing research and development dollars to design this system. The Army continues to monitor the Navy's Pathfinder Program as a developmental risk mitigator. On Feb. 23, 2006, TRADOC approved the PGK Capability Development Document and forwarded it to HQDA for approval. PM CAS received five proposals from a request for proposal and are presently conducting the technical evaluations to determine which contractors to select for the technology development phase.

For more information on cannon platforms and munitions systems, visit the Fires Knowledge Network Web site at <https://www.us.army.mil/suite/portal/index.jsp>.

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Here, an NLOS-C test platform fires a round last year at a test range at YPG. Likewise, successful firing of Excalibur at YPG has resulted in a CEP of less than 10 meters at all ranges. (Photo courtesy of the YPG Public Affairs Office.)