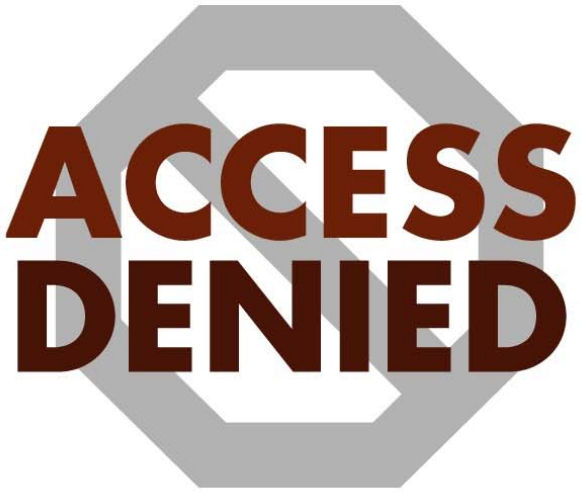


Modernization planning for the commander's freedom of action must blend current, future capabilities

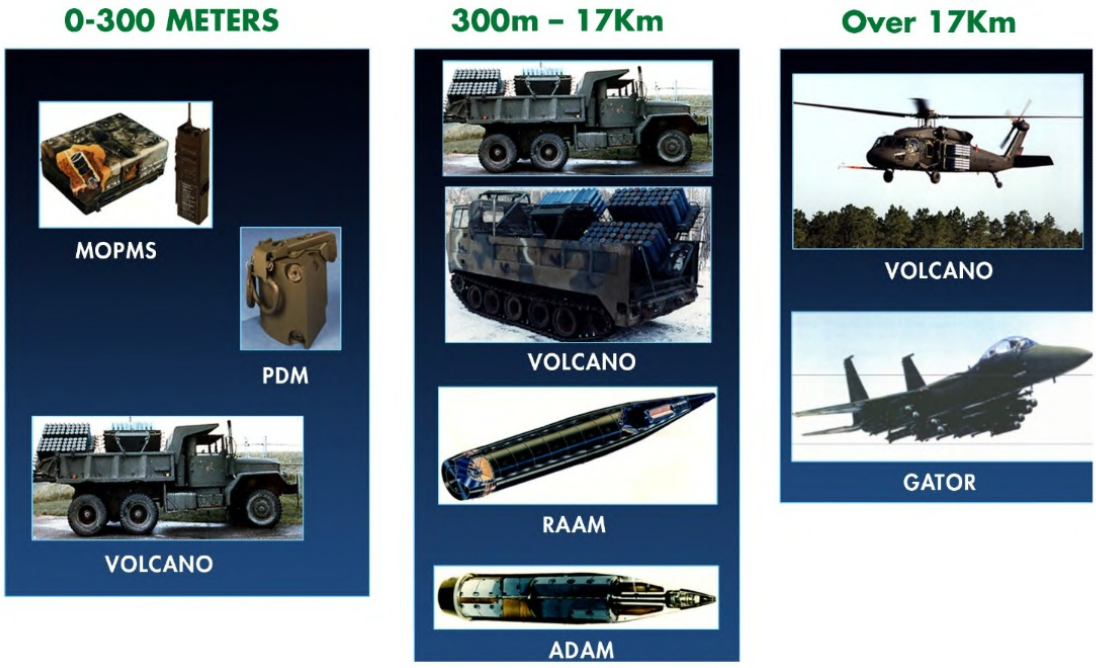
by Mr. Stephen J. Bielamowicz

The ability to adapt quickly to and address the immediate threats our forces faced in Operations Enduring and Iraqi Freedom (OEF and OIF) is a testament to the materiel development community and the strategic strength it represents. Conversely, though, the continuous adaptation redirected significant time and resources away from maintaining full-spectrum capabilities that address more traditional threats, and from modernization efforts to ensure our forces' ability to win the future fight. For example, improvised explosive devices (IEDs) posed a significant and evolving threat to our deployed forces in Iraq and Afghanistan. Adapting to this initially novel threat cost time and money that the Army might otherwise have spent on modernization.

Project Manager Close Combat Systems (PM CCS), within Program Executive Office (PEO) Ammunition, is charged with providing innovative area access capabilities to the warfighter to overcome the asymmetric IED threats that otherwise would limit the ability of U.S. troops to maneuver freely. PM CCS develops and manages systems and munitions that shape the battlefield by denying the enemy access to key terrain and restricting the enemy's ability to maneuver freely.

PM CCS originally developed and fielded systems such as the Self-Protection Adaptive Roller Kit (SPARK), the Rhino passive infrared defeat system, the Husky Mounted Detection System (HMDS) and various handheld devices, under joint urgent operational need statements (JUONS). These systems increased the commander's freedom of action by improving the mobility of deployed forces and preserved combat strength by saving lives and reducing equipment loss.

However, as the war in Afghanistan winds down and the Army rebalances its strength toward the Asia-Pacific theater, the PM CCS team and operational users are reassessing the necessary anti-access and area-denial (A2/AD) capabilities for the present and the future. Envisioning the threats of the next 20 to 30 years and aligning efforts with U.S. national security strategy, the Army has refocused on modernizing A2/AD capabilities that effectively support freedom of movement for friendly forces while impeding it for the enemy. The challenge facing PM CCS and PEO Ammunition now, similar to that facing other PEOs' program managers, is how best to manage and align diminished resources to ensure the continued sustainment and modernization of our A2/AD technologies to address anticipated capability gaps.



FAMILY OF SCATTERABLE MINES

FASCAM represents the U.S. inventory of nonpersistent land mines. It includes the Modular Pack Mine System (MOPMS), Pursuit Deterrent Munition (PDM), the ground- or rotary aircraft-emplaced Volcano, Remote Anti-Armor Mine (RAAM), Area Denial Artillery Munition (ADAM) and Gator, with different ranges and means of delivery. Future AD systems need to retain the effectiveness of the FASCAM systems while providing more operational flexibility and the ability to discriminate between targets more effectively. (Photo courtesy of U.S. Army)

Although the U.S. footprint in the Afghan theater is decreasing, our forces will continue to face a hybrid threat of IEDs and other irregular warfare tactics. According to the Center for Naval Analyses' May 2013 report "The Post-Afghanistan IED Threat Assessment: Executive Summary" (online at **www.cna.org/sites/default/files/research/DSI-2013-U-004754-Final-.pdf**), IEDs remain a global threat. The unified combatant commands are concerned that the enemy will use tactics from OEF and OIF to target U.S. interests in their areas of responsibility.

Future IED and other threats will assuredly share one key characteristic with today's threat: The enemy will improve them in an attempt to counter defeat. With knowledge gleaned from experience, future capabilities must be as flexible as the threat and enemy they will be employed against. In the case of IEDs, the enemy will use any tools and materials at their disposal to improve fabricated devices. If what they can produce does not fit their employment techniques, they will change tactics. If U.S. forces can render hostile techniques and tactics

ineffective, the enemy will seek alternate materials and sources of supply to create employable systems.

Therefore, the Army must design future systems with two overarching goals in mind. Systems must provide a broad baseline capability, in this case detection, while maintaining maximum flexibility for future modifications to counter emerging threats.

MODERNIZATION INITIATIVES

The Army is harvesting and modernizing previously fielded equipment to meet near-term requirements for countering the IED threat on the battlefield while planning for long-term modernization. Specifically, the Army is preparing HMDS for fielding to route clearance companies and brigade engineer battalions in the Army force structure. In conjunction with the engineer proponent at the U.S. Army Maneuver Support Center of Excellence (MSCoE), PM CCS has implemented deliberate steps to retain the current capability while keeping an eye on future improvements, to get the most value for the taxpayer's investment.

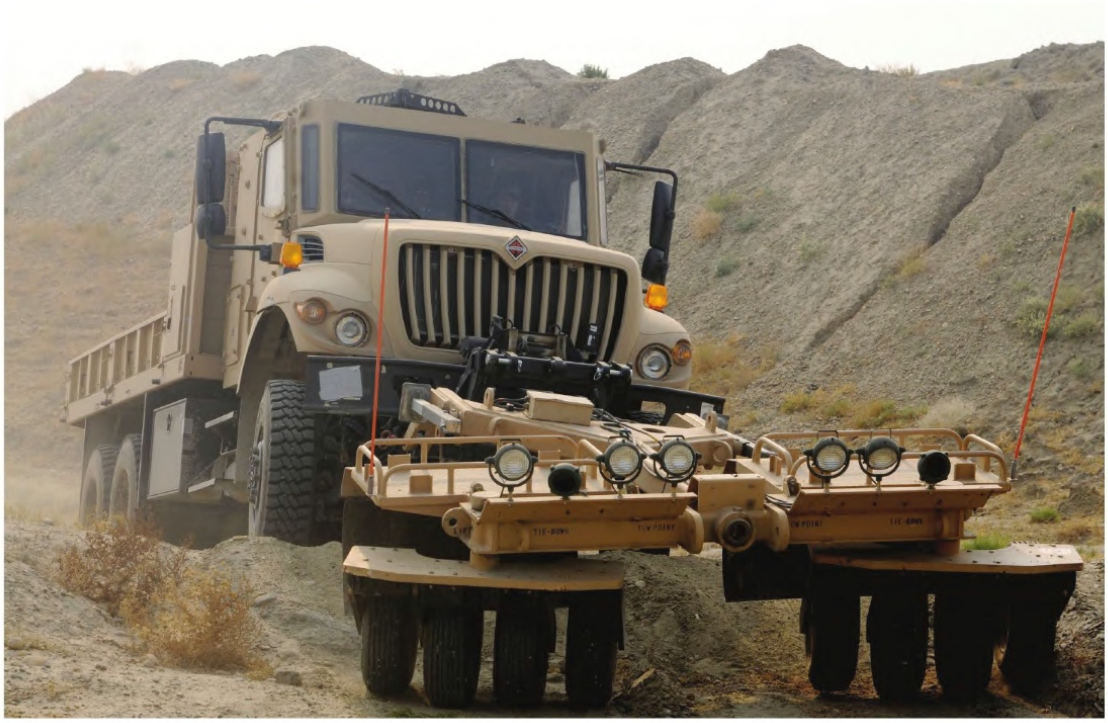
The Army is fielding HMDS in increments to allow future insertion of technologies still in development. This approach permits the near-term integration of the initial capability into the operating force while allowing capability modernization in the future. The initial increment will consist primarily of JUONS-fielded systems with a ground-penetrating radar capability that are currently in theater. The second increment will introduce the deep-buried detection capability, which will increase the system's effectiveness in finding deeply buried metallic explosive hazards. The final increment will add a semiautonomous capability allowing remote operation of HMDS, thus

SPIDER SETS THE STAGE

The Spider Networked Munition System, which has proven to be a highly effective force protection capability in OEF, provides munition field effectiveness equivalent to the capabilities provided by antipersonnel land mines, but without the life-threatening risks that persist after hostilities end. Future AD systems will need to provide a remote command-and-control capability similar to Spider's, but at much longer ranges. They will also need to have scalable effects for escalation of force, from nonlethal to antipersonnel and anti-vehicle. (Photo courtesy of U.S. Army)

SEND IN THE HUSKY

The Army is preparing the HMDS, shown here in use Sept. 24, 2013, by Marines with the 3rd Combat Engineer Battalion, for fielding to route clearance companies and brigade engineer battalions in its force structure. Fielding will be in increments, to allow future insertion of technologies still in development. (Photo by Cpl Austin Long, 2nd Marine Division)



FRONTAL DEFENSE

A 201st Afghan National Army Corps soldier negotiates a rough terrain course Sept. 28, 2013, at Forward Operating Base Gamberi using an Up Armored Medium Tactical Vehicle and mine roller on the final day of a five-week training course. Systems such as the mine roller have increased the commander's freedom of action in OEF by improving the mobility of deployed forces. (U.S. Army photo by SGT Eric Provost, Task Force Patriot Public Affairs)

increasing the standoff distance and reducing risk to the engineer Soldier.

Similarly, the current development of the Autonomous Mine Detection System (AMDS) builds on previously fielded detection capabilities while increasing effectiveness and standoff. To better employ this capability within dismounted formations, the U.S. Army Engineer School conceived the AMDS payloads. AMDS seeks to place detection capabilities on a robotic platform to increase standoff distance between the operator and any detected threats. AMDS will include a detection and neutralization payload to counter explosive threats. These modernization effects will improve detection and neutralization capabilities for engineer clearance missions, and will increase A2 capability and Soldier survivability.

AREA DENIAL

The enemy we have faced over the past decade did not have large quantities of heavily armored fighting vehicles or supply transports, so there was no need for our forces to limit or deny the mobility of such assets. As a result, the Army paid less attention to maintaining and training the effective AD capability that unified land operations require. In addition, unlike the A2 portfolio, AD

systems have not benefited from ongoing investments in technology and sustainment. Land mines developed during the Vietnam era are still the only systems available to provide our forces the required AD capability.

Land mines typically have two subcategories: nonpersistent mines, with the ability to self-destruct or self-deactivate, and persistent mines. Persistent land mines, while effective and relatively inexpensive, have no self-destruct ability and have the negative collateral effect of denying both friendly and enemy forces access to the mined area. In addition, persistent land mines remain lethal until action is taken to clear the minefield. If persistent mines are not cleared, they can remain a threat to the indigenous civilian populations for decades. As a result, U.S. land mine policy banned the use of all persistent land mines after 2010, leaving nonpersistent land mines as the only option currently available for operational use.

The U.S. inventory of nonpersistent land mines is the Family of Scatterable Mines (FASCAM). FASCAM systems include the hand-emplaced Modular Pack Mine System, ground- or rotary aircraft-emplaced Volcano, artillery-delivered Area Denial Artillery Munition and Remote Anti-Armor Mine, and the high-speed, aircraft-delivered Gator. FASCAM systems are more effective than older persistent mines because of their more advanced target detection capability. However, they are also more expensive because of their more advanced technology.

All FASCAM systems have a highly reliable self-destruct capability with a self-deactivation backup that greatly reduces any residual threat to civilian populations. However, like persistent mines, the FASCAM systems limit the mobility of friendly forces while emplaced. There is no remote-control capability, and they are indiscriminately activated by the proximity of the target.

ENGINEERING A SOLUTION

Engineers with the 91st "Saber" Brigade Engineer Battalion, 1st "Ironhorse" Brigade Combat Team, 1st Cavalry Division (1-1 CAV) fire a simulated mine-clearing line charge at an obstacle Nov. 12, 2013, during a combined arms live-fire exercise with tankers assigned to 2nd "Stallion" Battalion, 8th Cavalry Regiment of the Ironhorse Brigade, as part of the training exercise Ironhorse Rampage at Fort Hood, TX. Engineer Soldiers are among the primary beneficiaries of new developments in A2 capabilities. (U.S. Army photo by SSG John Couffer, 1-1 CAV).

A BALANCED APPROACH

As the Army modernizes capabilities to address these gaps, future AD systems need to retain the effectiveness of the FASCAM systems while providing more operational flexibility and the ability to discriminate between targets more effectively.

One current AD system, already in use in Afghanistan, that exemplifies this balance of effectiveness and flexibility is the Spider Networked Munition System. Spider is not a land mine; it is not activated by the presence, proximity or contact of a target. When the system detects a potential target, it alerts a human operator, who then identifies the target and determines whether to fire the lethal or nonlethal effects.

This system has proven highly effective in a force protection role in support of OEF. Future AD systems will need to provide a similar remote command-and-control capability, but at much longer ranges. They will also need to have scalable effects for escalation of force, from nonlethal to anti-personnel and anti-vehicle.

MSCoE, which plays a large role in modernizing AD systems and influencing their capabilities, is currently developing requirements that outline the overarching AD capabilities for potential future conflicts and scenarios. These requirements address the shift away from attacking enemy mobility

MINE WORKERS

A combat engineer squad assigned to Brigade Special Troops Battalion, 2nd Brigade Combat Team, 82nd Airborne Division (2-82 ABN) emplaces an M131 Modular Pack Mine System Sept. 19, 2013, as part of a sapper competition on Fort Bragg, NC. (U.S. Army photo by SSG Jason Hull, 2-82 ABN Public Affairs)

and instead focus on developing new means of denying enemy movement and freedom of action.

The probable next-step AD capability will be scalable, precise in application and discrete in effects. The future capability must be able to integrate with existing battle command systems and enhance the effects of force application and stability operations that seek to separate the friendly and non-committed from hostile elements.

Lessons learned during the Spider program will guide the modernization of FASCAM and the development of replacement systems. One of the most significant challenges during Spider development was the safety-critical nature of the system, the result of having software control the munition fuze. In order to receive safety certification and eventual full materiel release, the development team worked closely and frequently with the Army Fuze Safety Review Board to review the architecture, design and test results, and to ensure that a safety process was established and followed throughout the program. This close coordination with the safety community will be a process model during the modernization of future software-controlled munition systems.

Another lesson learned during the development of Spider was that battalion commanders quickly realized during collective training exercises that emplacing a Spider field required the opposing force to rethink their approach completely. Realistic training aids, devices, simulators and simulations for FASCAM replacement systems will facilitate collective training at home stations and combat training centers. This will demonstrate to commanders the value of emplacing these systems during operational engagements and will promote the train-as-you-fight construct.

In addition, PM CCS must endeavor to reduce development and production cost by applying acquisition strategies such as competitive procurement and leveraging existing commercial technologies.

CONCLUSION

The need for continued modernization and sustainment of A2/AD capabilities will endure for limited conflicts, hybrid threats and decisive operations conducted as part of unified land operations.

Future systems need to be agile enough to counter ever-changing threats but still affordable enough to produce and sustain with limited resources. Investing in the modernization of new A2/AD technologies is critical to shaping the battlefield while ensuring the mobility of friendly forces and concurrently minimizing risks to civilian populations. Based on a strong relationship with the combat development community and a track record of developing and delivering safe, reliable and effective A2/AD systems, PM CCS is well-positioned to provide our forces with the modern materiel solutions necessary to support our nation's security strategy, ensuring mobility- and terrain-shaping capabilities on the battlefield well into this century.

For more information about PM CCS, go to ***http://www.pica.army.mil/pmccs/Default.html.***

MR. STEPHEN J. BIELAMOWICZ is the Spider Team lead for PM CCS, PEO Ammunition, Picatinny Arsenal, NJ. He holds an M.S. in management from the Florida Institute of Technology and a B.S. in mechanical engineering from Lafayette College. Bielamowicz is Level III certified in both program management and engineering and is a member of the U.S. Army Acquisition Corps.