



## ARDEC's Fast-Track Armaments Provide Full-Spectrum Battlefield Dominance

Michael P. Devine and Anthony J. Sebasto

**A**t the U.S. Army's Armament Research, Development and Engineering Center (ARDEC) at Picatinny, NJ, engineers and scientists are providing America's warfighters solutions to today's battlefield challenges faster than ever before. In an environment that once measured progress by decades, the laboratories here are creating new metrics that are based on speed, flexibility, value and customization.

Often called the home of Army lethality, Picatinny's ARDEC and its program executive office (PEO) and project management office (PMO) partners have provided more than 90 percent of the Army's weapons and munitions systems for well over a century. Current support to Iraq and Afghanistan represents a new chapter in this long tradition of Soldier support.

ARDEC's rich heritage and strong knowledge base acts as a springboard for innovative armaments engineering practices and technologies. U.S. forces are benefiting from the full spectrum of

Picatinny's armaments expertise in a number of ways. This article will highlight some of the armament systems and advanced technologies supporting the Joint warfighting community today.

### Urgent Fieldings

ARDEC understands the immediacy of the Soldier's needs. During a 12-month period, the center and its partners responded to urgent Army and Joint service requests by fielding 17 specialized weapons and ammunition systems in record time. Among these are:

- *Gunfire Detection System (GDS)*. The GDS quickly detects and locates the origin of small-arms fire, allowing troops to rapidly return fire, enhancing their survivability. Twenty systems — 10 fixed and 10 vehicle-mounted — were fielded within 90 days of receiving a requirement.
- *M211/212 Advanced Aircraft Infrared Countermeasure Flares*. The M211/212 flares counter all known surface-to-air missile (SAM) threats by serving as decoys that confuse the SAM's infrared guidance systems. Army aviator CW3 Al Mack, 160th Special Operations Aviation Regiment

summed up the M211/212's effectiveness — "Our MH-47E fleet had 16 confirmed SAM firings during the first 6 months of the Afghanistan conflict. I had two SAMS fired during a daylight flight with then Commander, U.S. Central Command (CENTCOM) GEN Tommy Franks onboard. The flares dispensed automatically. I think I am sitting here writing because our aircraft survivability equipment (ASE) worked," Mack explained.

- *XM1060 40mm Thermobaric Grenade.* This 40mm device, developed and fielded by Picatinny within a 4-month span, is the very first small-arms thermobaric device released to the war theater. It's applauded as a critical tool for military operations in urban terrain and close-quarters cave applications.
- *Advanced M26 Taser Stun Pistol.* Adapted for Army use from a commercial design, the M26 nonlethal weapon is used for crowd control and detainee management. It provides the soldier with a less-than-lethal option appropriate to control personnel situations.

**On-The-Ground Support**

ARDEC engineers are found wherever U.S. troops are living and

fighting. They serve as the Army's "911" lifeline for lethality assistance and troubleshooting. This always-open line of communication helps engineers assess the effectiveness of existing and newly fielded weapon systems, as well as identify warfighter needs. Recently, CENTCOM and the 82nd Airborne Division at Fort Bragg, NC, reported unacceptable readiness and performance of various small-arms weapons. Picatinny engineers were deployed and on the ground within 72 hours performing weapon inspections, training the troops on scheduled maintenance procedures and developing workable field inspection and repair criteria. These reports prompted a Picatinny-led mission in July 2003

A B Company, 2nd Battalion, 504th Parachute Infantry Regiment (PIR) Soldier, his M4 Carbine at the ready, watches for enemy forces in the Baghran Valley during *Operation Mountain Viper*. B Company's mission was to prevent the reemergence of terrorist activities in Afghanistan. The M4 Carbine performed remarkably well in the rough, mountainous terrain. U.S. Army photo by SPC Preston E. Cheeks, Kandahar Army Airfield.



of representatives from Fort Benning, GA, ARDEC and PM Soldier

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Weapons to evaluate reliability and performance of individual soldier weapon and ammunition systems under combat conditions. The team visited Tikrit, Mosul, Irbil and Baghdad as well as sites in Afghanistan. It interviewed 1,000 soldiers and obtained valuable feedback on weapon performance and field problems.

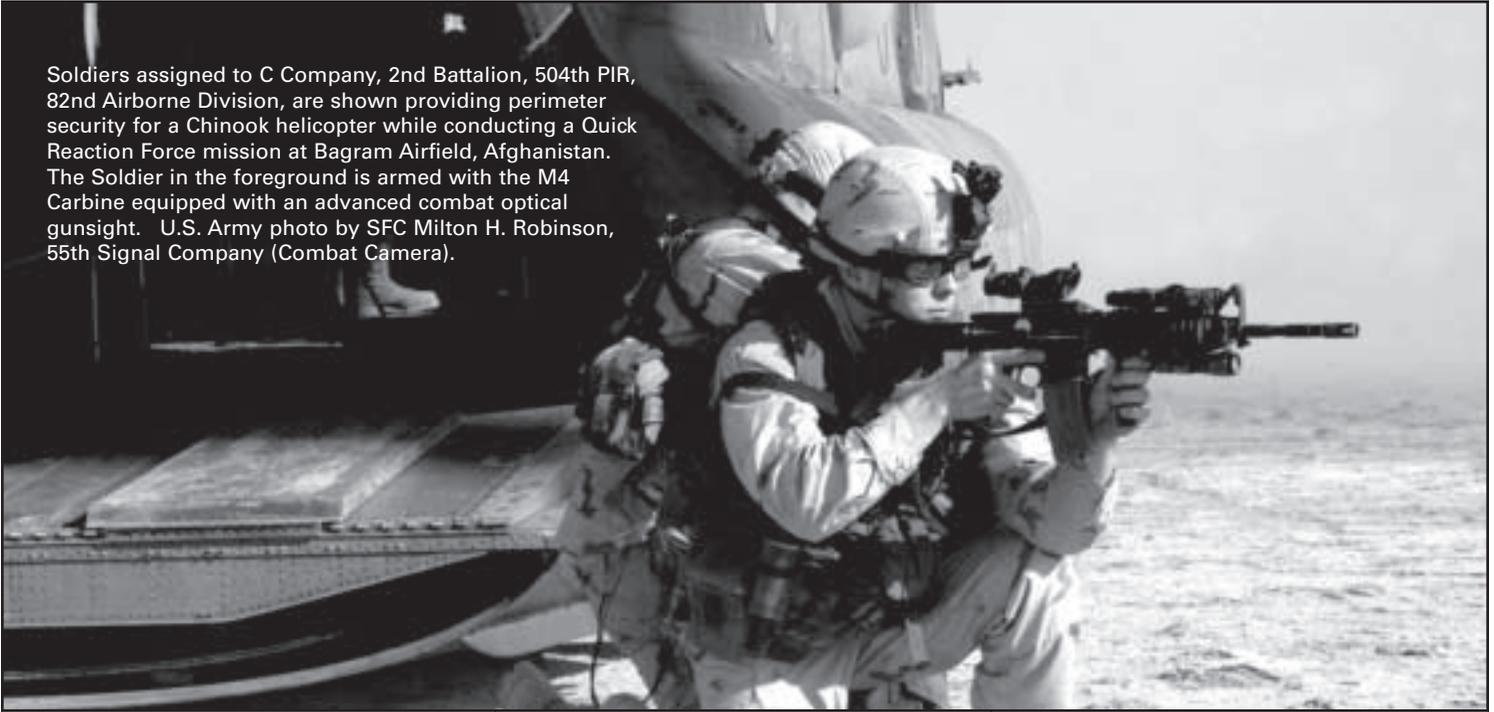
In a similar scenario, the 101st Airborne Division reported that its M139 Volcano mine-delivery systems were inoperative for an upcoming deployment. ARDEC engineers immediately deployed to Fort Campbell, KY, to

troubleshoot and repair the systems and conduct a New Equipment Training refresher course. The ARDEC team successfully returned two of three systems to full operational readiness.

While on a fact-finding mission in Iraq and Afghanistan, the Picatinny Explosive Ordnance Disposal unit collected vital information about enemy ordnance and explosive devices. The unit developed protocols and procedure guides that enabled U.S. Joint Forces personnel to download information on how to render safe foreign ground combat enemy weapons for disarming and disposing of captured and abandoned tanks, missiles and attack helicopters.

Most recently, Picatinny engineering teams provided on-site support to the new Stryker Brigade Combat Team (BCT). The teams assisted the BCT

Soldiers assigned to C Company, 2nd Battalion, 504th PIR, 82nd Airborne Division, are shown providing perimeter security for a Chinook helicopter while conducting a Quick Reaction Force mission at Bagram Airfield, Afghanistan. The Soldier in the foreground is armed with the M4 Carbine equipped with an advanced combat optical gunsight. U.S. Army photo by SFC Milton H. Robinson, 55th Signal Company (Combat Camera).



PMO and its industrial contractors by integrating and testing various Picatinny-developed weapon systems for Stryker armored vehicles headed to Iraq. A Picatinny team also trained soldiers from Fort Lewis, WA, on a newly developed logistics software program for efficient and safer configuration of munitions for loading onto shipping platforms.

### Ensuring America's Armaments Inventory Remains Strong

The majority of weapons systems and ammo used by the Army are drawn from standing inventories. These items were designed by Picatinny engineers and many industry partners. Several of these systems deserve highlighting because of their superb performance during in-theater operations in both Iraq and Afghanistan. The Bunker Defeat Munition has destroyed hardened emplacements, masonry walls and light armored vehicles. "This thing is a real kick in the pants," said SSG Lonnie Schultz, Infantry Squad Leader, 31st Infantry Regiment, 10th Mountain Division, when describing this lightweight

83mm shoulder-launched weapon. Likewise, a 3rd Infantry Division after action report credited the Search and Destroy Armor (SADARM) smart-guided 155mm artillery munition because it exceeded all battlefield expectations and it became the preferred precision munition for the field artillery battalions and their supported maneuver commanders.

"The SADARM was very effective against tanks/light armored vehicles, with three rounds killing at least one tank. It never missed," explained LTC Doug Harding, a former 3d BCT Fire Support Coordinator/1st Battalion, 10th Field Artillery Brigade commander. Of 121 SADARMS fired during *Operation Iraqi Freedom*, 48 pieces of enemy equipment were completely destroyed. SADARM defeated all known armor and artillery targets on the battlefield.

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— featured a highly mobile, highly lethal shoot-and-scoot capability. Fielded after *Operation Desert Storm*, it fires a first round 30 seconds after stopping and delivers devastating firepower at ranges up to 30 kilometers. This capability, realized by its highly automated navigation and fire control system, got rave reviews from howitzer crews and commanders alike during the "dash to Baghdad."

Soldiers have high praise for small-arms superiority that stems from weapons such as the M4 Carbine, M249 Squad Automatic

Weapon (SAW) and M240 Machine gun. In fact, Soldiers have hailed the M240 Machine gun as one of the best

weapons on the battlefield. “Three different soldiers firing the same gun outperformed a group of 30 gunners using other equipment,” said MSG Michael Valdez, 82nd Airborne Division. The new, urgently fielded XM107 Barrett .50-caliber sniper rifle was recognized as a key element in urban fighting.

### Developing Advanced Weapon Systems

U.S. military capability must keep pace with the changing world to ensure supremacy throughout the entire spectrum of conflict. Looking ahead, ARDEC engineers are working on a range of advanced warfighting and counterterrorism systems to support Army transformation. One such capability — the Armed Talon robot — is a small, highly maneuverable remote-controlled tracked vehicle fitted with lethal and nonlethal armaments and is currently undergoing tests at Picatinny. Talon’s battlefield introduction will provide a new dimension to warfighting capability and enhance soldier lethality and survivability.

Leading industry combat vehicle developers like General Dynamics and United Defense have entered into cooperative research and development (R&D) agreements with Picatinny’s ARDEC to support mounted combat systems, non-line-of-sight cannons (NLOS-C) and NLOS mortar variants as well as other cannon, fire control and munition technologies.



SPC Joshua Mambre, A Company, 2nd Battalion, 22nd Infantry Brigade, cleans his M249 SAW following a long day of operations with the 10th Mountain Division (Light Infantry) searching for Taliban and weapon caches in the Afghanistan province of Daychopan. U.S. Army photo by SSG Kyle Davis, 55th Signal Company (Combat Camera), Kandahar Army Airfield.

ARDEC, working in partnership with the Army Research Laboratory and U.S. Navy, is expanding R&D efforts on electromagnetic gun technology and novel, pulsed-power gun concepts that eliminate the need for today’s energetic propellants. Development activities are maturing the technology and generating notional system designs ranging from small arms to large caliber direct- and indirect-fire systems that provide either very high velocity defeat of advanced targets or long-range projectiles, depending on the application.

ARDEC’s development portfolio also supports exploration into “leap-ahead” and disruptive technologies such as nanotechnology and direct energy-based, scalable effects weapon systems. Ultimately, ARDEC engineers are focused on enhancing individual and crew-served weapons performance and expanding future warfighter capabilities regardless of where the battlefield takes them.

Warfighting will continue to depend on the combatant’s ability to address the full spectrum of conflict by delivering desired effects on target and reducing threat capabilities. Picatinny’s mission is to research, develop and integrate advanced armament technologies into weapon systems that meet or exceed warfighter needs. No other organization in the

world provides the overall world-class portfolio of armament systems and advanced technologies that support a broad range of Joint service warfighters today and tomorrow.

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