

Top 10 Army Modernization Efforts of 2016

By David Vergun

WASHINGTON (Army News Service) -- Supporting the fight around the globe means having the best technologies for Soldiers to ensure overmatch against future adversaries in an increasingly complex and dangerous world where the threat is often “elusive and ambiguous,” said Army Vice Chief of Staff Gen. Daniel B. Allyn, speaking at an industry event in Michigan.

This environment will place a premium on unmanned systems, lethal technologies and rapid maneuver capabilities, he added. The Army will need to ride the wave of technology or risk being left behind, cautioned Lt. Gen. Michael E. Williamson.

Consumer electronics are advancing at an “incredibly rapid pace. The average time to obsolescence of some devices, such as home computers and smart phones, is as fast as 24 months,” said Williamson, who is the principal military deputy to the assistant secretary of the Army for Acquisition, Logistics and Technology. He spoke at a “Network Readiness in a Complex World” panel hosted by the Association of the United States Army in July.

In 2016, Army researchers and scientists, along with industry partners, continued to make great strides in modernization. Following is a sampling of 10 of the top advancements and milestones.

30MM CANNON FOR STRYKER

The first prototype Stryker Infantry Carrier Vehicle, outfitted with a 30mm cannon, was delivered to the Army Oct. 27. The upgraded Stryker vehicle will be known as the Dragoon, the name of the 2nd Cavalry Regiment. The prototype also features a new fully-integrated commander’s station, upgraded drivetrain componentry and hull modifications, according to a press release from Program Executive Office-Ground Combat Systems.

“It’s important to realize the genesis of this event,” said Allyn, speaking at the General Dynamics Land Systems Maneuver Collaboration Center in Sterling Heights, Michigan.

Following the 2015 Russian invasion of Ukraine, Army leaders in Europe “identified a capability gap that threatened our forces in theater,” Allyn explained. “The Russians, it turns out, had upgraded and fielded

significant capabilities while we were engaged in Iraq and Afghanistan.”

Army leaders recognized that existing Stryker weaponry placed U.S. forces at “unacceptable risk,” he said. The Urgent Operational Needs statement submitted in March 2015 resulted in a directed Stryker lethality requirement, one that included an accelerated acquisition effort to integrate the 30mm cannon on the vehicles, he said.

Fielding to the 2nd Cavalry Regiment in Europe will begin in May 2018, which represents “a near-record time from concept to delivery,” according to Allyn.

According to PEO-GCS, the Army has provided programmatic direction to initiate the first two elements of the Stryker Fleet Lethality strategy: providing an under-armor Javelin capability for the Stryker and improving the capabilities of the Stryker Anti-Tank Guided Missile vehicle to better locate and engage targets via networked fires.

LIGHTWEIGHT BALLISTIC SHIRT

When Army engineer Robert DiLalla set out to develop a new design for Soldier protection, he knew he had to break the mold.

The result of his revolutionary approach, which focuses on the Soldier as an athlete, is the gamechanging, Ballistic Combat Shirt, a new lightweight body armor system.

“We set out with this science and technology effort to meet the needs of high-performance athletes, which is what Soldiers are,” said Dilalla, the team leader of the Infantry Combat Equipment Team at the Natick Soldier Research, Development and Engineering Center.

“I was really focused on the human. How can we do something that, without sacrificing protection, makes them feel like they are not wearing protection and improves their ability to do Soldier tasks?”

“This capability significantly increases the protection and flexibility of our personal protective ensemble, ensuring we are giving our Soldiers the edge they need,” said Douglas A. Tamilio, director of

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Natick Soldier Research, Development and Engineering Center.

The invention is a departure from the Interceptor Body Armor system, which was an advancement when it was developed for the Marine Corps in the late 1990s. Over the years, however, the armor system increased in complexity and bulk. As additional components were added, it became difficult for Soldiers to put it on. In contrast, the Ballistic Combat Shirt is easy to don.

“So now instead of having to attach all of these components, you can throw it on like a goalie shirt in hockey,” DiLalla said. “It goes on and you don’t need a buddy to help you don the system. It’s form-fitting so the Soldiers like it. Instead of one panel, the deltoid section is three panels. It’s contoured so it stays with you. It moves with you. It has an improved range of motion.”

The shirt weighs 35 percent less than the current Interceptor Body Armor system components it replaces and is less bulky.

The invention has been a hit with users.

“The Soldiers have spoken loud and clear with more than 90 percent user acceptance in multiple user evaluations,” said DiLalla. “Typically, as we assess new body armor components, we’d consider 60 percent a successful number. So we were quietly surprised...”

DOUBLING HOWITZER RANGE

Picatinny Arsenal engineers have been working to create a longer, newly modified M777A2 howitzer that has the potential to double the system’s current artillery range.

The modification, called the Extended Range Cannon Artillery, or ERCA, adds six feet to the cannon and less than 1,000 pounds to the overall system. A mobility demonstration is the first step to determine if the howitzer can be modified for extended range, or if a new system is required. Mobility testing will be conducted at Aberdeen Proving Ground, Maryland, in the near future.

“Right now [the M777] can shoot about 30 kilometers, but once all of the upgrades are complete, it will be able to shoot about 70 kilometers,” said David Bound, M777ER Lead, Artillery Concepts and Design

Branch, which is part of the Armament Research, Development and Engineering Center, or ARDEC.

“It will be able to reach out and hit targets well in excess before the targets can reach them. It will also give a lot of operational overmatch so the warfighter won’t have to worry about coming into a situation where they are under fire before they can return fire,” said Bound.

The M777ER program will ensure that ERCA’s system is suitable for the M777 system. The final ERCA system will be demonstrated with an M109A7 system, which is the Paladin self-propelled howitzer.

NEW HAND GRENADE

Engineers at Picatinny Arsenal are working on the first new lethal hand grenade in more than 40 years, which is designed to give greater flexibility to the warfighter.

The multi-purpose hand grenade design will provide both fragmentation and blast overpressure more effectively and safely than its legacy counterparts.

Once fielded, Soldiers will be able to select and use a hand grenade with different effects simply by flipping a switch, said Jessica Perciballi, ARDEC project officer for Enhanced Tactical Multi-Purpose, or ET-MP, Army, Grenades & Demolitions Division.

Soldiers will not need to carry as many types of hand grenades, Perciballi said. Another feature is that the new grenades are designed for ambidextrous use, meaning that they can be thrown with either hand. Current grenades require a different arming procedure for left-handed users.

“Not only will ET-MP provide additional capabilities and lethality to the warfighter, it will also be the first Army Fuze Safety Review Board and Insensitive Munition-qualified lethal grenade in the Army’s portfolio,” Perciballi added.

“With these upgrades in the ET-MP, not only is the fuze timing completely electronic, but the detonation train is also out-of-line,” said Matthew Hall, Grenades Tech Base Development Lead.

“Detonation time can now be narrowed down into milliseconds, and until armed, the hand grenade will not be able to detonate.”

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Hall said the current plan for ET-MP is to transition the new grenades to Project Manager Close Combat Systems in fiscal year 2020.

JLTV DEBUT

The first seven joint light tactical vehicles were turned over to the Army and Marine Corps in late September by Oshkosh Defense for testing at different sites around the force. A total of about 100 of the JLTV “production vehicles” will be provided to the Army and Marine Corps for testing over the next year, at a rate of about 10 per month, officials said. The vehicles will undergo maneuverability and automotive testing at Yuma Proving Ground, Arizona, and other sites around the country.

The JLTV is a tactical wheeled vehicle with a chassis that offers protection from underbelly blasts and an “intelligent” suspension system that can be raised and lowered for off-road conditions. It also touts greater fuel efficiency than current tactical vehicles.

In addition to testing at Yuma, the vehicles will undergo testing for cyber integration of command, control, communications and intelligence at the Electronics Proving Ground on Fort Huachuca, Arizona. The vehicles will also be tested for automotive performance at Aberdeen Proving Ground, Maryland and the Cold Regions Test Center on Fort Greely, Alaska.

“It’s on schedule,” said Scott Davis, program executive officer for combat support and combat service support, about the JLTV program. “It’s doing everything we ever expected it to. It’s just incredible.”

QUANTUM PHYSICS

At the U.S. Army Research Laboratory, scientists are looking at new ways to exploit the most fundamental or “quantum” component of light -- the photon -- to enhance communications, sensing and cryptography, and anything else they can think of.

“We don’t really know what all the applications are. But our mandate, in part, is to find those applications,” said Michael Brodsky, a physical scientist at Army Research Laboratory.

In October, Brodsky was setting up a new lab at the ARL, located about 12 miles north of the Pentagon in Adelphi, Maryland. He has boxes there that gener-

ate entangled photons -- the smallest measure of light. It’s entangled photons that are of interest to Brodsky and the Army. A pair of entangled photons exhibits a unique property that Brodsky and his team hope to exploit.

A single photon, on its own, can be captured in a memory unit -- or “quantum storage” -- and subsequently measured. The measurements can be recorded as well. But when two entangled photons are captured and measured in the same way, they yield the same measurements every time, Brodsky said.

Those same two entangled photons could be split up, on different sides of the lab, on different sides of a research campus, or on different sides of the country, and still, because they are entangled, they behave the same way, and so they yield the same measurements no matter where they are.

The results of those measurements are unpredictable -- completely random -- and can be converted to a string of zeros and ones, Brodsky said, but “you get identical strings of zeros and ones at two remote locations. Which, for instance, could be used as a key for secure communications.”

A critical part of cryptography and secure communications is the use of random numbers. On both sides of the communication, both parties will need the same string of random numbers to encrypt that communication. If both parties had one half of an entangled pair of photons, then they would both have an endless supply of random numbers at their disposal, and those random numbers would be the same. So a pair of entangled photons, distributed to two parties, could be used to encrypt communications between the two parties.

Finding ways to distribute entangled photons, and using those entangled photons for secure networking are just two challenges that ARL is working on now. But they are looking at other ways to use entangled photons as well, such as enhancing sensors and quantum computing, for instance.

NEW ARMORED VEHICLE

The first armored multipurpose vehicle, or AMPV, was handed over to the Army Dec. 15 for testing.

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The AMPV demonstrator rolled out of the BAE Systems plant in York, Pennsylvania, to begin a 52-month engineering and manufacturing development phase for the vehicle. At least 29 of the vehicles will be manufactured for this phase of the procurement process, officials said.

If the low-rate production option for the AMPV is approved, procurement officials said several hundred of the vehicles will be manufactured for testing over the next four years.

The AMPV will replace the armored brigade combat team's M113 family of vehicles. The AMPV addresses the M113's shortcomings in survivability and force protection, and size, weight, power, and cooling, known as SWAP-C, officials said. It is also designed to incorporate future technologies and the Army's network.

The AMPV has a brand new hull, but it maintains some of the Bradley legacy design, allowing for some compatibility efficiencies, according to Maj. Gen. David G. Bassett, program executive officer for Ground Combat Systems. In fact, about 60 to 70 percent of the parts are common with existing ground combat vehicles, Bassett said during a press conference in October.

The AMPV also has space inside to allow for the addition of new systems in the future, and it comes with an improved power train. The hull is stronger from a force protection perspective, too, he said.

Meanwhile, many Bradleys are still in service, "so we're building new capabilities in an incremental way over time," Bassett said. "I'd love to have replacement programs today for Abrams and Bradleys,"

Bassett said. "We could get those plans [for replacements], but it just doesn't fit into this portfolio and budget requirement. Instead we're looking at, do you want to do an ECP-3 [engineering change proposal] on a Bradley or do you want to bridge to a new platform? We're making informed decisions."

HYDROGEN-POWERED VEHICLE

The Army Tank Automotive Research, Development and Engineering Center and General Motors unveiled an energy-efficient tactical vehicle that could one day save lives on the battlefield.

The ZH2 hydrogen-fuel-cell electric vehicle prototype was rolled out Oct. 3, during the Association of the United States Army Annual Meeting and Sym-

posium. Kevin Centeck, team leader for Non-Primary Power Systems, Ground Vehicle Power and Mobility Directorate, TARDEC, said the vehicle comes with several advantages for the Army and Soldiers in the field.

First, the ZH2 operates on hydrogen fuel instead of traditional diesel. It uses much less fuel than traditional tactical vehicles. At idle, it is "extremely efficient," Centeck said. This should reduce the logistics train.

Second, since the vehicle uses hydrogen with electric power, it has an extremely low acoustic signature, meaning it's very quiet. "It's silent mobility, silent watch," Centeck said. "You don't give away your position by turning on the engine."

Third, the ZH2 has a radically reduced thermal signature because it doesn't operate as hot as a diesel engine, which means the heat signature is harder to pick up by enemy thermal sensors, providing additional stealth for Soldiers.

A fourth, less direct, but nonetheless important advantage cited by Centeck, is that the ZH2 demonstrated that the Army could build such a vehicle rapidly, using mostly off-the-shelf parts. The ZH2 took just one year from concept to delivery. The vehicle itself is basically a Chevy Colorado platform.

NEW TOURNIQUET

Hemorrhage control is the No. 1 thing you can do to save lives on the battlefield, according to Lt. Gen. Nadja Y. West.

"Stop the bleeding as soon as you can, and stop it as much as you can," said West, who serves as surgeon general of the Army and commander of the Army Medical Command. She spoke Aug. 18, at a meeting of the Defense Writer's Group in Washington, D.C.

One of the latest advances in treating hemorrhaging on the battlefield, West said, is what is known as the "junctional tourniquet," which can be applied to wounds in ways not possible with conventional tourniquets.

Traditionally, a medic or fellow Soldier can apply a tourniquet just to a person's limb, she explained. A traditional tourniquet cannot be used to stop hemorrhaging in the abdomen, chest, groin, waist, pelvis or

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armpit.

Developed at Army Medical Research and Materiel Command, Fort Detrick, Maryland, the junctional tourniquet is essentially a belt with one or more inflatable air bladders that can be puffed up, somewhat like a blood-pressure cuff, to apply pressure to a wound.

The device can be deployed to stop hemorrhaging in about 60 seconds.

The junctional tourniquet is now being fielded to Soldiers in harm's way, but it's so new -- just months since fielding -- that West hasn't yet been briefed on how many lives it has saved, though she believes the number will be significant over time. The new tourniquet is currently being fielded only to medical personnel, though it may in the future become available to line troops, she said.

IMPROVED TURBINE ENGINE

Degraded lift capability is especially problematic in areas where high-altitude, high-temperature flights are required, including nearly half of Afghanistan, said Maj. Gen. William K. Gayler.

Gayler, commander, U.S. Army Aviation Center of Excellence and Fort Rucker, Alabama, spoke at the Army Aviation Association of America-sponsored 2016 Army Aviation Mission Solution Summit in Atlanta, April 29 and 30.

Using the UH-60 Black Hawk helicopter as an

example, Gayler said an average of about 78 pounds per year have been added annually -- for all the right reasons. That includes increased protective gear, ammunition, new technologies and so on. Over the years, those increases have totaled about a ton-and-a-quarter.

All of that weight affects speed, lift, range, maneuverability and the amount of stuff that can be carried, he said.

Years ago, four Black Hawks could move a platoon, he pointed out. Now, it takes eight or nine and by 2020 -- assuming the linear weight increases continue at the current rate -- it will take 15 to 20, he said.

The Improved Turbine Engine Program, or ITEP, is a completely new engine that will likely one day replace those currently in the AH-64 Apache and Black Hawk helicopters, Gayler said. It will return a lot of that lost capability.

"ITEP is critical," he said. "We must get it right to buy back maneuverability."

Brig. Gen. Bob Marion, Program Executive Officer-Aviation, said ITEP is a big deal for the Army and it will be resident in about 85 percent of its platforms. It also has potential for Future Vertical Lift, or FVL, if not the motor then pieces of the technology, he said.

FVL's engineering and manufacturing development doesn't begin until fiscal year 2024 with the first aircraft test in FY26. 

What is a Traumatic Brain Injury?

TBI Facts

•TBIs can occur on the battlefield, the football field, the playground, in a car accident, and even at home.

•A mild TBI/concussion is treatable; early detection is extremely important.

•Common causes of an TBI/concussion on the battlefield include blasts, vehicle collisions, or blows to the head.



Traumatic Brain Injury (TBI) is a disruption of brain function, resulting from a blow or jolt to the head, or penetrating head injury. The severity of the TBI is determined at the time of the injury and may be classified as: mild, moderate or severe.

COMMON SIGNS AND SYMPTOMS:

- **Headaches**
- **Changes in sleep**
- **Dizziness**
- **Nausea/vomiting**
- **Fatigue**
- **Balancing Problems**
- **Sensory changes**
- **Slowed thinking**
- **Difficulty concentrating**
- **Memory problems**
- **Depression or anxiety**
- **Mood swings**