



GREENER VIRTUAL REALITY

Marielle G. Payton, an Army intern within the Office of the Chief of Public Affairs, tries on a virtual reality headset connected to a Reconfigurable Virtual Collective Trainer during a demonstration of advanced simulation training systems by the Program Executive Office for Simulation, Training and Instrumentation at the Pentagon in July 2023. Training simulators reduce time, fuel and wear and tear spent in the field. (Photo by Bernardo Fuller, Army Multimedia and Visual Information Division)



THE GREEN MACHINE

The Army is using new environmental technology to become a leaner, meaner and greener fighting machine.

In this issue, readers will learn about many examples of the adoption of technology and systems that are reducing the Army's environmental footprint. Working closely with industry, the Army is introducing more efficient turbine engines, hybrid electric power plants, alternative energy generating systems, cleaner manufacturing, virtual technologies and other innovations.

The benefits of adopting environmentally friendly technology does not stop at reducing negative environmental impacts; they also save the taxpayer money, reduce logistical demands and better safeguard Soldier health. But the most important benefit is that this technology is increasing the Army's combat effectiveness. We are not trading off lethality and survivability for reduced environmental impact, we are getting both!

In short, the Army acquisition community, working with industry, is making the Army an even leaner, meaner and greener fighting machine.

Let me give some examples.

FLIGHT UPGRADE

Green investments in more powerful, cleaner and more fuel-efficient power plants are showing a lot of promise.

The new T901 aviation turbine developed under the Army's Improved Turbine Engine Program demonstrates the potential of green technology. This program uses advanced coatings to increase engine durability and reduce engine weight. It is also designed to use advanced diagnostics and system prognostics.

The result is that the T901 turbine produces 50% more power yet uses 25% less fuel than the T700 aviation engines currently used in the Army's AH-64 Apache and UH-60 Black Hawk helicopter fleets. It is also more durable and costs less to operate. Helicopters equipped

with these engines can conduct missions carrying heavier loads faster and for longer distances without refueling.

An added benefit is that the T901 is also designed to fit in the same space as the T700, which makes it easy and affordable to gradually upgrade the Army's existing Apache and Black Hawk fleets with this more powerful and economical engine.

GROUND IMPROVEMENTS

New greener power plants are being developed for land vehicles. We are also developing retrofit kits to upgrade existing engines with fuel-saving technology. Program Executive Office for Ground Combat Systems (PEO GCS) and PEO Combat Support and Combat Service Support seek to reduce the logistical burden of the Army's ground vehicle portfolio by integrating new technologies that reduce fuel consumption, increase powertrain efficiency, reduce maintenance support at the tactical edge and utilize predictive maintenance. This means fewer fuel convoys and fewer logistics trains will be needed to sustain our units, which puts fewer Soldiers and assets at risk. Vehicle platforms with electrification provide other benefits to the warfighter, such as extending range and mission duration, increasing silent mobility and improving sprint speeds.

Here are some of the improvements being developed, along with the tactical benefits they provide:

- Intelligent anti-idle controls, which are already proven in civilian vehicles, reduce engine run time and provide limited silent-watch capability.
- Fuel-sensing software, also available in some civilian vehicles, efficiently reduces fuel consumption.
- Onboard vehicle power systems lower logistical burdens. These efficient onboard systems function as the vehicle's alternator, but also have enough excess generating capacity to provide electric power where needed. In many situations, these systems can replace towed generators that reduce unit mobility and require additional maintenance and fuel supplies. In this fashion, onboard vehicle power systems reduce overall fuel consumption, make units more agile on the move and make it easier for units to move from one position to another.
- Hybrid propulsion systems improve fuel economy and acceleration, optimize silent watch/mobility capability and increase power generation.



BRINGING EFFICIENCY TO THE BATTLEFIELD

Advancements in anti-idle technology were on display as engineers with the DEVCOM Ground Vehicle Systems Center and project leaders with the Joint Program Office for Joint Light Tactical Vehicle (JLTV) demonstrated the operational benefits of the center's Tactical Vehicle Electrification Kit integrated on a JLTV in March 2022. (Photo by Jerome Aliotta, DEVCOM Ground Vehicle Systems Center)



GREEN MACHINE

An M1280 JLTV sits by Lake Afton in Afton, Kansas, in July 2023. The Army is seeking to retrofit Humvees and the JLTVs with the Tactical Vehicle Electrification Kit. (Photo by Spc. Steven Johnson, 19th Public Affairs Detachment)

We are making progress in adopting these new technologies for the Army's vehicles.

The Army's first anti-idle capability, called the Tactical Vehicle Electrification Kit, has been developed for the 8x8 Heavy Expanded Mobility Tactical Truck. The Army is seeking to retrofit Humvees and

this technology could be considerable. One estimate says that a brigade with 325 JLTVs could save up to \$1.5 million in fuel costs each year by using the anti-idle kits. The savings could be multiplied 300-fold, if the Army's fleet of roughly 100,000 tactical vehicles were either replaced or retrofitted with anti-idle kits.

Not all green technologies involve electricity.

the Joint Light Tactical Vehicles (JLTVs) with this technology, which automatically stops an engine from idling and restarts it when the operator steps on the gas pedal. The technology is proven and has already been adopted in many civilian vehicles. The savings from installing

The Army is also making progress in developing new power plants for combat vehicles. The newest iteration of the Abrams tank, the M1E3, will be equipped with a hybrid-diesel-electric power plant that will give it the same tactical range as the M1A2 Abrams, but will consume 50%

less fuel. We are also exploring the use of efficient hybrid-electric power in other armored vehicles. In 2023, BAE delivered and conducted testing at the Aberdeen Test Center on two hybrid-electric engines demonstrated with the Bradley platforms.

Looking forward, the Army's recent budget request supports entering production of anti-idle retrofit kits in fiscal year 2025 and starting the Electric Light Recon Vehicle prototyping effort in fiscal year 2024. The Tactical Vehicle Electrification Kit, which provides anti-idle and expanded onboard power capability for JLTVs and the Family of Medium Tactical Vehicles, is programmed for fiscal year 2025.

EQUIP THE INDIVIDUAL

Green technology benefits are not restricted to aviation and ground vehicle platforms. Systems have been developed for the dismounted Soldier, whose personal equipment includes many systems that use electricity: Thermal and night vision sights, rangefinders, radios and flashlights.

PEO Soldier, working with industry, has developed a few new systems. These include:

- The Universal Battery Charger Lite, which is a small charger that can be powered by solar panels.
- The Soldier-Worn Power Generator now under development is a fuel cell that can use different kinds of fuel, including methanol, hydrogen or even windshield washing fluid, to generate electricity for recharging batteries.
- The All-Terrain Electric Mission Module (ATeMM) is an electrified trailer powered by a 47-kilowatt-hour battery and electric motor. It uses regenerative technology to generate electricity and charge its battery as it is towed by



CLEAN AIR

Lt. Col. Kelley Nalley, the Improved Turbine Engine product manager, right, discusses the recently delivered T901 engine with Bell Senior Vice President Chris Gehler, left, and Richard Crabtree, Improved Turbine Engine Program integrator. The T901 turbine produces 50% more power with 25% less fuel than the T700 engines. (Photo by David Hylton, PEO Aviation)

common military vehicles. The trailer can be used to supply power to command posts and other purposes. What makes this system unique is that it can also use its stored power to power its own wheels and can be used to assist the towing vehicle when necessary. In effect, the towing vehicle and the ATeMM trailer can function like a hybrid electric vehicle when needed.

PROTECT THE FORCE

Not all green technologies involve electricity.

Joint PEO Chemical, Biological, Radiological and Nuclear Defense has developed the Autonomous Decontamination System that allows Soldiers to conduct decontamination of vehicles while minimizing human contact. It uses sophisticated sensors to detect and map contamination, then uses this information to precisely apply the decontaminants. This targeted method lowers the risk of accidentally spreading contamination and

significantly reduces the amount of hazardous waste produced during decontamination.

It is also worth noting that going green doesn't only involve how you "do" things. It can also involve how you "make" things.

Joint PEO Armaments and Ammunition (JPEO A&A), which oversees the Army's organic ammunition plants, has embarked on a program to reduce waste, especially hazardous waste involved in the production and use of ammunition. These efforts reduce pollution and waste, reduce costs by conserving materials, and are healthier because they reduce Soldier and worker exposure to toxic materials. These efforts include:

- **Reusing materials:** JPEO A&A's Project Director Joint Services team came up with an approach that chemically converts waste stream material into ingredients that can be used in mu-

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nitions production. This approach addresses the issue of costly waste disposal, ensures a reliable supply of critical chemicals onsite and reduces dependence on overseas suppliers.

- **Using fewer toxic materials:** JPEO A&A chemists have come up with new formulations to reduce the use of heavy metals or other harmful chemicals. This includes removing lead from percussion primers used in small arms ammunition, mercury in obstacle-breaching explosives or naphthalene in black smoke simulators. Interestingly, the naphthalene was replaced by a far more benign compound: sugar.
- **Lightweight polymer ammunition:** Lightweight polymer ammunition will reduce the consumption of brass for shell casings, which will cut costs and also significantly reduce weight for our warfighters, land vehicles and aircraft. Project Manager Maneuver Ammunition Systems (PM MAS) has worked closely with the Marine Corps on the advancement of .50-caliber MK323, which reduces cartridge weight and link weight by around 26%. The Marine Corps has demonstrated the MK323 to be a well-performing alternative to legacy cartridges. To support life cycle sustainability, the Joint Light Weight Integrated Product Team has planned further studies in fiscal year 2024 to improve recycling processes to produce pellets for 3D printing and injection molding to produce parts, including ammunition casing. In collaboration with the Marine Corps, PM MAS has executed multiple milestones to support transition of the MK323 to the Single Manager for Conventional Ammunition (SMCA). PM MAS is projecting transition to the SMCA in fiscal year 2026.

PEO GCS has made great progress in making production more environmentally friendly.

- **Reducing the use of carcinogenic materials—cadmium and hexavalent chromium:** We are working with Army Futures Command's Combat Capabilities Development Command (DEVCOM) and the Watervliet Arsenal in New York to replace the use of hexavalent chromium with trivalent chromium in the production of heavy

cannon and mortars. The multiyear conversion of its manufacturing processes should be complete by 2028. PEO GCS is also working to transition from using cadmium as well as hexavalent chrome finishes to zinc nickel for rust-resistant finishes for fasteners. This strategy was piloted on the Paladin M109A6 and primarily focuses on identifying alternative coatings for fasteners. PEO GCS is working with industry partners to develop technical specifications and identify sources for zinc nickel-finished fasteners.

PEO GCS also aims to make the manufacturing process itself far more energy efficient.

- **Coreless induction furnaces:** The Army plans to replace all eight old casting furnaces at Rock Island Joint Manufacturing Technology Center (JMTC) with high-efficiency coreless induction furnaces. Instead of heating and melting metal using the external application of heat through electric arcs or flame, these furnaces use electromagnetic induction to produce heat directly in the metal. This green furnace technology is far more energy efficient, controllable and flexible than alternative furnace technologies. This conversion is significant because the JMTC is the Army's only foundry and produces castings for Abrams tanks, Navy ships and the Defense Logistics Agency among other customers.
- **Sonic vapor degreasers:** The Army has purchased two sonic vapor degreasers to clean parts and equipment at Anniston Army Depot, which services combat vehicles, locomotives, nontactical generators and small caliber weapons. The cleaning process usually depends upon use of volatile solvents, but sonic cleaning technology uses nontoxic chemicals instead. This system provides better results and protects the health of depot workers as well as the environment.

DIGITALLY GREEN

The Army's effort to increase combat effectiveness and reducing our impact on the environment doesn't always involve replacing old equipment, techniques or materials. Sometimes it involves—at least temporarily—replacing the training grounds themselves.



EXCELLENCE IN ACQUISITION

A team from PEO ACWA received the David Packard Excellence in Acquisition Award on Jan. 24, 2024, at a ceremony at Fort Belvoir, Virginia. From left: Bobby Phillips, Anniston Field Office technical lead; Tami Atkins, acting program executive officer; Lt. Gen. Robert Collins, military deputy/director, Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology; Michael Abaie, former program executive officer; and Timothy Garrett, director of PEO ACWA Field Operations. Not pictured are team award winners Dr. Candace Coyle, former site project manager at the Blue Grass destruction plant, and Walton Levi, site project manager, Pueblo destruction plant. (Photo provided by PEO ACWA)

The PEO for Simulation, Training and Instrumentation (STRI) is demonstrating that use of cyberspace can benefit both combat effectiveness and the environment as well. PEO STRI is using virtual training to make a big difference in the cost and impacts of Army operations. Sophisticated simulators allow trainees to gain experience on aircraft, vehicles or other systems so that when they do get seat time in the actual machines, they are already familiar with how they work and feel. This reduces time, fuel and wear and tear spent in the field. It also minimizes rookie training mistakes that can result in injuries or damaged equipment and makes time spent in the cockpit more useful.

PEO STRI is also contributing to reducing environmental impacts and lowering costs through sophisticated digital modeling. Exact digital models of systems and platforms, called “digital twins,” are used during the development and testing phase

to reduce research and development and production costs. They can also be used to enhance training and assist in predictive maintenance during sustainment.

The digital environment is not only benefitting Army readiness, it benefits the real-world environment as well.

CONCLUSION

Finally, PEO Assembled Chemical Weapons Alternatives (ACWA) received special recognition in January 2024 for improving the world environment. A team from PEO ACWA received the prestigious David Packard Excellence in Acquisition Award for “demonstrating the acquisition management and technical skills to implement measures that reduced schedule risk, while maintaining worker safety and enabling the United States to complete the destruction of the remaining chemical weapons stockpile by the Chemical Weapons Convention commitment deadline.”

On July 27, 2023, the final munition in our stockpile of chemical weapons, a sarin nerve agent-filled M55 rocket, was destroyed at the Blue Grass Army Depot in Kentucky. All told, the United States destroyed more than 30,000 tons of chemical agents, from mustard agents to nerve gas. We are all justifiably proud of the effort the PEO ACWA devoted to the safe destruction of these lethal chemicals.

From development of new technologies to decontamination of systems, and the elimination of old munitions and other waste, the Army acquisition team is working hard to reduce the Army’s environmental impact at the same time it is supplying Soldiers with the best possible weapons and equipment. By making the Army greener and meaner, Army acquisitions professionals are benefitting the Soldier, the taxpayer and the environment. 🇺🇸