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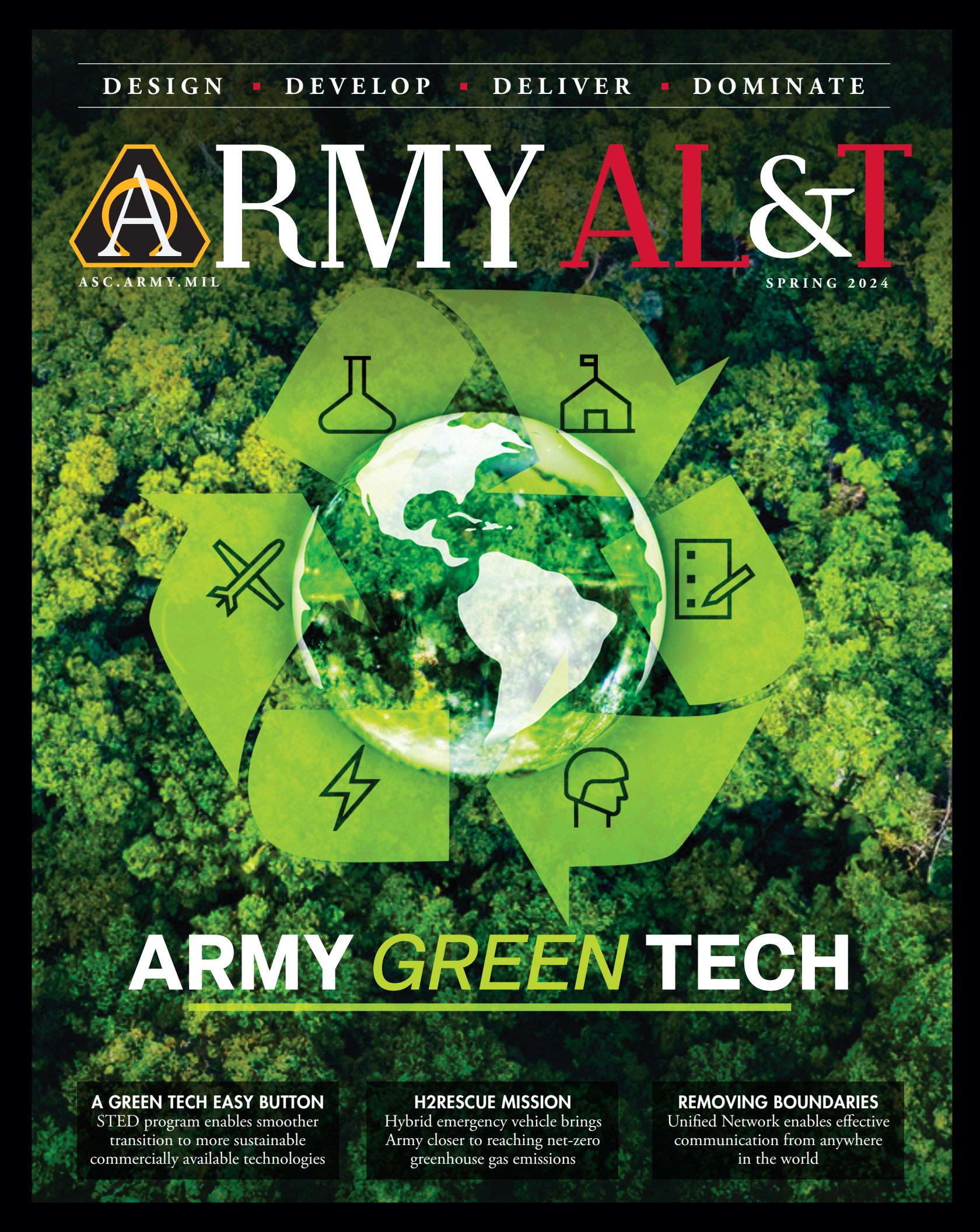

ARMY *GREEN* TECH

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H2RESCUE MISSION
Hybrid emergency vehicle brings Army closer to reaching net-zero greenhouse gas emissions

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FROM THE AAE

ARMY GREEN TECH

ON THE COVER

A green Army that eliminates waste is more efficient, cuts military lines of communication supply requirements, and the need of Soldiers to secure routes, shortages of supplies and vulnerability to enemy attack—ultimately saving lives.

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FEATURE ARTICLES

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WORKFORCE

From the Editor-in-Chief

When you think about going "green," the first thing you generally think of isn't the U.S. Army.

With the Army, or most militaries in general, you might conjure up images of exhaust-belching tanks, diesel- or gas-guzzling self-propelled artillery or Joint Light Tactical Vehicles, helicopters, etc. Most likely when you think of "green," it is forest preservation, clean water, the Environmental Protection Agency, wildlife, sustainable fishing … not the Army. But you would be wrong! Sure, the Army's mission is to fight and win this nation's wars, but you don't have to pollute and waste to do so. As a matter of fact, conservation is, as they say, a combat multiplier.

As outlined in the 2022 Army Climate Strategy, "As the Army invests in modernization, readiness and operations, it aims to create land forces that meet current needs while securing a sustainable, cleaner tomorrow. … By optimizing fuel, water, electricity and other resources, the Army increases resilience, saves taxpayer dollars and reduces its environmental impact."

A green Army that reduces waste is more efficient, reduces military lines of communication (air, sea, land) supply requirements, and reduces shortages of supplies, vulnerability to enemy attack and the need of Soldiers to secure routes—ultimately saving lives.

So, instead of "tree hugger," environmental activist, nature lover or any negative connotations you might have about being green, instead, think "smart, sustainable, efficient and deadly." The Army going "green" is a good thing both for the environment, for today's Army and for the future.

In this issue, explore the many ways the U.S. Army, through the direction of the Army acquisition executive, the Honorable Douglas R. Bush, along with the Army Acquisition Workforce and our industry partners are creating and fielding technology to make the Army more effective and efficient. As mentioned earlier, efficiency in the field is critical to our future. Learn how the Army's Improved Turbine Engine will provide Army aviation with all the power, range, payload and lethality it needs … while reducing the force's greenhouse gas emissions in "Cleaner Air on the Horizon," Page 56. And, as you may have noticed, energy is at the heart of a green Army, so the development of alternative fuels and systems is paramount. On Page 32, read about how the new hybrid hydrogen (H2) emergency vehicle and its H2 fuel cell are bringing the Army closer to reaching net-zero greenhouse gas emissions by 2050 in "H2Rescue Mission." Finally, going green isn't always about technology; sometimes it's about more efficient processes. In "Shaking the Tree," Page 92, see how xTech is ushering in a new era of innovation by linking Program Manager Soldier Lethality with potential industry partners, allowing small vendors to compete alongside larger companies, and streamlining the competition process. Great idea!

Email Nelson McCouch III
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There is much, much more in this issue of interest to those in the acquisition community, and I encourage you to browse this issue and discover what Army acquisition is working on to make the U.S. Army the very best in the world. As always, if you have comments, story ideas or want to submit your very own story, please contact us at **armyalt@army.mil**. We look forward to hearing from you.

Nelson McCouch III
Editor-in-Chief

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 refit 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 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 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 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-

We are not trading off lethality and survivability for reduced environmental impact, we are getting both!

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 AWCA)

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.

ACQUISITION BOOK OF KNOWLEDGE

Army Regulation 70-1 delivers a foundational change in acquisition policy to the Adaptive Acquisition Framework through speed, tailoring and digital transformation.

by Anthony M. Taylor

COMBAT SPEED
Sgt. Maj. of the U.S. Army Michael A. Grinston unveils the new M10 Booker Combat Vehicle during the Army Birthday Festival at the National Museum of the U.S. Army, Fort Belvoir, Virginia, June 10, 2023. The new AR 70-1 will accelerate delivery of critical capabilities to Soldiers, such as vehicles like these. (Photo by Bernardo Fuller, Army Multimedia and Visual Information Division)

"The newly published Army Regulation 70-1 represents a significant update for Army acquisition policy. For the first time, it makes permanent in Army regulation a comprehensive suite of policies that will help to accelerate the speed of acquisition and delivery of critical capabilities, encourage and empower our program managers to employ flexible and creative acquisition approaches, and accelerate the Army's digital transformation. This policy change is a critical enabler in achieving positive acquisition outcomes."

—Margaret Boatner, deputy assistant secretary of the Army for strategy and acquisition reform, January 2024

In the midst of the Army's most significant modernization effort in decades, the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (OASA(ALT)) plays a pivotal role in ensuring critical capabilities are developed and fielded to the warfighter. To be successful, the Army Acquisition Workforce must have clear, consistent guidance that enables that workforce to effectively navigate the complexities of the defense acquisition system.

The latest revision of Army Regulation (AR) 70-1 "Army Operations of the Adaptive Acquisition Framework," published on Nov. 28, 2023, is the guidance and critical enabler that allows the OASA(ALT)'s acquisition leaders and practitioners to perform that pivotal role. As the Army's foundational acquisition regulation, AR 70-1 now permanently codifies the latest in defense acquisition policies and innovative thinking, enabling speed, creativity, flexibility and the Army's digital transformation effort.

ENABLES ACQUISITION SPEED

One of the tenets of the Adaptive Acquisition Framework is to simplify acquisition policy. Implementation of the Middle Tier of Acquisition achieves this by bridging a gap in the defense acquisition system for mature capabilities that can be prototyped and fielded rapidly, within five years of program start.

The Honorable Ellen Lord, former undersecretary of defense for acquisition and sustainment, described the Adaptive Acquisition Framework as "the most transformational acquisition policy change we've seen in decades." The framework, she said, allows for "innovative acquisition approaches that deliver warfighting capability at the speed of relevance." (See "How Relevant Is Speed?" in the Spring 2021 issue of Army AL&T.)

That speed of relevance is now codified in AR 70-1, which guides the Army acquisition enterprise with both speed of relevance and speed of service. This is evident in Army aviation's Future Long Range Assault Aircraft program, which in October 2020 used the Middle Tier of Acquisition Rapid Prototyping Pathway to develop two prototypes and then down-select to one vendor in December 2022, just two years later.

In contrast, it is estimated that the traditional Major Capability Acquisition pathway would have taken three years. Additionally, the Middle Tier of Acquisition pathway enabled the Next Generation Squad Weapon program to divide into two separate efforts: fire control, and weapons and ammunition. The new pathway transitioned from rapid prototyping to rapid fielding in less than 3.5 years, a process that traditionally could have taken nearly five years using the Major Capability Acquisition pathway. It is this combination of pathways that encourages and enables flexibility and creativity.

EMPHASIZES TAILORING

AR 70-1 now codifies several streamlining initiatives that emphasize tailoring documentation requirements, acquisition approaches and program review requirements to allow for flexibility and creativity. These qualities are amplified not only by the combination of adaptive acquisition pathways but also by employing creative approaches, such as the use of the Simplified Acquisition Management Plan (SAMP) and the Acquisition Category IV (ACAT IV) program. Tailored reviews and focus on relevant acquisition approaches are necessary to define and execute a program result in a customizable acquisition strategy. That is where the SAMP comes into play. The SAMP helps to streamline and accelerate the acquisition process by consolidating program documentation, previously found in multiple standalone products, into one document.

Adopted from the special operations community, which comprises approximately 3% of the U.S. Army, SAMPs can now be used for the remaining 97% of the Army by the Army acquisition community. It is a fully tailorable and adaptable document that provides a venue for integrating plans and approaches for engineering, cost, sustainment, test and the overall acquisition approach in

FLRAA TESTED

The Program Executive Office for Aviation conducted a Future Long Range Assault Aircraft (FLRAA) Soldier touch point at the end of November 2023 at the Bell Flight Research Center in Arlington, Texas. Led by the FLRAA Project Office, the touch point was the first of up to 12 events the Army plans to conduct to optimize both human and system performance while ensuring mission ready capabilities are delivered to the warfighter. (Photo by Cpt. William Derrick, 1st Air Cavalry Brigade)

one document. The SAMP, along with the creation of ACAT IV programs (defined as procurements less than or equal to $440 million and research, development, testing and evaluation less than or equal to $110 million, based on fiscal year 2020 constant dollars), and their delegation of authority to program executive offices promotes a "buy, try and decide" mindset.

It was this type of mindset, coupled with the use of the Middle Tier of Acquisition Rapid Prototyping pathway, tailored reviews, and streamlined documentation requirements to meet program production, cost and schedule objectives, that allowed the M10 Booker (formerly Mobile Protected Firepower) to meet these program objectives within four years. Conversely, use of the Major Capabilities Acquisition pathway would have taken six to 10 years.

SUPPORTS DIGITAL TRANSFORMATION

One of the most influential changes in the Adaptive Acquisition Framework is the addition of the Software Pathway. This pathway is specifically designed for the development of custom software solutions and offers several benefits, including exemption from the traditional requirements and acquisition processes.

Most importantly, however, this pathway supports programs adopting and implementing modern software developmental approaches used in the private sector. The adoption of these agile, iterative software development approaches will be a critical element of the Army's broader digital transformation.

Currently, within OASA(ALT), there are 14 programs utilizing this pathway, with more expected to transition to the pathway in the coming months. AR 70-1 not only codifies the use of this

It is this combination of pathways that encourages and enables flexibility and creativity.

6 PATHWAYS

There are six pathways within the Adaptive Acquisition Framework (AAF). Additional information on the pathways, decision points and phases (or equivalents), information requirements and other criteria are identified in DOD Instruction (DODI) 5000.02 and with more specificity in the DODI that corresponds to each AAF acquisition pathway as follows:

- For urgent capability acquisition (UCA), DODI 5000.81 and paragraph 2-7 of AR 70-1.
- For Middle Tier of Acquisition (MTA), DODI 5000.80 and paragraph 2-8 of AR 70-1.
- For Major Capability Acquisition (MCA), DODI 5000.85 and paragraph 2-9 of AR 70-1.
- For software acquisition, DODI 5000.87 and paragraph 2-10 AR 70-1.
- For defense business systems (DBS), DODI 5000.75 and paragraph 2-11 of AR 70-1.
- For acquisition of services, DODI 5000.74 and paragraph 2-12 of AR 70-1.

Additional details and active links to overarching policies, functional policies, service and agency policies, and acquisition guides for each AAF pathway can be found at **aaf.dau.edu**.

pathway but also provides the framework for engineering application requirements. It provides overarching guidance on the application of systems engineering as well as streamlining or tailoring the requirements of the System Engineering Plan (SEP) as it relates to a standalone SEP or having it nested within the Simplified Acquisition Management Plan.

AR 70-1 is the culmination of how the Army acquisition community has revamped its internal processes, business model and transformation across the organization to meet the demands of digital transformation.

CONCLUSION

The wait is over! The Army's cornerstone regulation for acquisition, AR 70-1 (Army Operation of the Adaptative Acquisition Framework), is published and ready for use. It codifies the latest in defense acquisition policy to accelerate the acquisition speed of development while placing emphasis on tailoring in key requirements as well as creative and innovative approaches to acquisition documentation and processes. The overhaul of these processes will usher the Army acquisition workforce into the era of digital transformation and ensure critical capabilities are delivered to Soldiers at the point of need. It encompasses more than six years of acquisition reform and is the apex acquisition document that provides regulatory guidance to a workforce of more than 32,000 acquisition professionals.

For more information, go to the Army Publishing Directorate website for the new policy ***https://armypubs.army.mil****.*

ANTHONY M. TAYLOR, a former Army major (field artillery and acquisition), is a senior acquisition policy specialist in the Policy Directorate in the Office of the Deputy Assistant Secretary of the Army for Strategy and Acquisition Reform, part of the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology. He holds an M.S. in engineering management from Missouri University of Science and Technology and a B.S. in mechanical engineering from North Carolina Agricultural and Technical University. He is a Project Management Professional and DAWIA certified Practitioner in program management and in engineering.

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PREVENTION MEASURES
TRND is a major step toward identifying potential risks from environmental regulations, and their impact on the supply chain, to achieve long-term risk mitigation. (Photo by Arthur Ogleznev, Pexels)

PREVENTION IS THE *BEST* DEFENSE

A new regulatory database for assured supply chains aims to prevent the deployment of suspect harmful chemicals into the environment.

by Cheryl Marino

We're all for products that are stain resistant, waterproof, anti-corrosive and made to last. But the not-so-charming side of these wonders lies in the "forever chemicals" that make them tick. It's a tale of innovation and unintended consequences, where the very features we cherish in our products are casting a shadow on the delicate balance of the Earth's ecosystems.

Munitions, whether used for training, stockpiles for wartime needs or provided in support of our friends and allies, play a vital role in the military's mission to defend the nation. They contain various chemicals that enhance performance and ensure Soldier safety. However, there is evidence suggesting that some of these materials may pose environmental risks, despite their benefits to our military forces.

We may be years away from revamping munitions manufacturing to remove these harmful chemicals, but taking some preventative steps now will reduce pollution, safeguard groundwater, ensure compliance with environmental regulations and enhance public health and safety in the future.

Environmental oversight of these chemicals is increasing, so program managers and technology researchers must strike a delicate balance to deliver capability for the warfighter while exercising proper environmental stewardship.

A new database tool called TRND, which developers pronounce as "Trend," aims to achieve that balance by providing the munitions community with a tool for rapid assessment of the current munitions supply chain and analysis of novel emerging energetics.

Identifying potential risks from environmental regulations and their impact on the supply chain—early, and more easily—to achieve both near- and long-term risk mitigation. Meaning reduced supply chain issues and less harmful chemicals polluting the environment.

The U.S. Army Combat Capabilities Development Command Armaments Center (DEVCOM AC) Life Cycle Readiness Branch is developing the TRND database tool in support of the U.S. Army Joint Program Executive Office for Armaments and Ammunition's (JPEO A&A) Assured Munitions effort.

The application of TRND is more simplistic than its acronym, which stands for the first four datasets used with the tool:

T – Toxic Substances Control Act.

R – Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

N – National Aerospace Standards.

D – Department of Defense Emergent Chemicals.

"This is a powerful resource that can be used to quickly identify where and how emerging chemicals of regulatory concern are present in JPEO A&A end items and or supply chain," said Brian Hubbard, JPEO A&A's Environmental, Safety and Occupational Health (ESOH) officer. "The tool can be used by stakeholders supporting materiel developers and project management offices to identify how changing laws, regulations and policies could impact the ability to field armaments and ammunition items."

According to Hubbard, the intent of TRND is to serve as a solution, where the TRND team can rapidly identify the environmental regulatory risks of a chemical or material, communicate impacts to acquisition stakeholders across their chain of command and, if necessary, begin research into [less hazardous material] substitution or replacements that still achieve performance requirements and enable Soldier readiness.

THE LATEST TRND

To grasp the necessity for TRND, it's important to comprehend the impact that global environmental regulations have on DOD operations. Things like insufficient material supply; logistical complications; schedule delays; changes to hazard management; demilitarization; manufacturing; and raw material mining may collectively hinder task execution, raise costs, affect performance and necessitate adaptations requiring effective navigation to maintain operational efficiency and readiness.

The TRND tool is capable of monitoring environmental regulatory agencies and their watch lists containing emerging environmentally concerning chemicals and can be used to steer research in a direction to prevent some of these challenges going forward.

It also simplifies the task for engineers by eliminating the need to manually search for the presence of listed chemicals in the munitions supply chains. Before TRND, engineers had to extract data from multiple sources to determine whether the chemical components in their catalog items were on some of the regulatory lists.

"I thought, there's a much better way to do this," said Veronica Copp, environmental program specialist in the Life Cycle Readiness Branch at the Armaments Center, who developed the TRND worksheet tool. Copp said what started out as a phone call from Hubbard about the current process, sparked the development of a greatly needed tool that cross walks 8,379 catalog end items, subcomponents and chemicals in the JPEO A&A portfolio against multiple regulatory requirement databases like the DOD watch list, industry standards, Environmental Protection Agency (EPA) regulations and the 27-member European Union. "It was like seeing a niche need, and then responding to that with a 20-year-old technology niche."

TRND streamlines the process into a single database tool that analyzes catalog items, breaks them down into their chemical components and compares them against the regulatory lists. "We look to see how those are regulated right now and how we think that they will be regulated in the future," she said.

The next iterative step, she said, will be to expand the database to include chemical synthetization route alternatives, which will map end items down to a manufacturing level. This can be used to add functionality of health and safety and byproducts in the manufacturing process and provide a more comprehensive look at the supply chain.

According to Copp, enhanced search criteria, chemical mapping integration, weapon system detail and user interface can be further developed in a more refined product to close identified gaps in data reporting. As well as improvements for a more user-friendly report interface and integration of additional data sources.

THE GREEN SCHEME

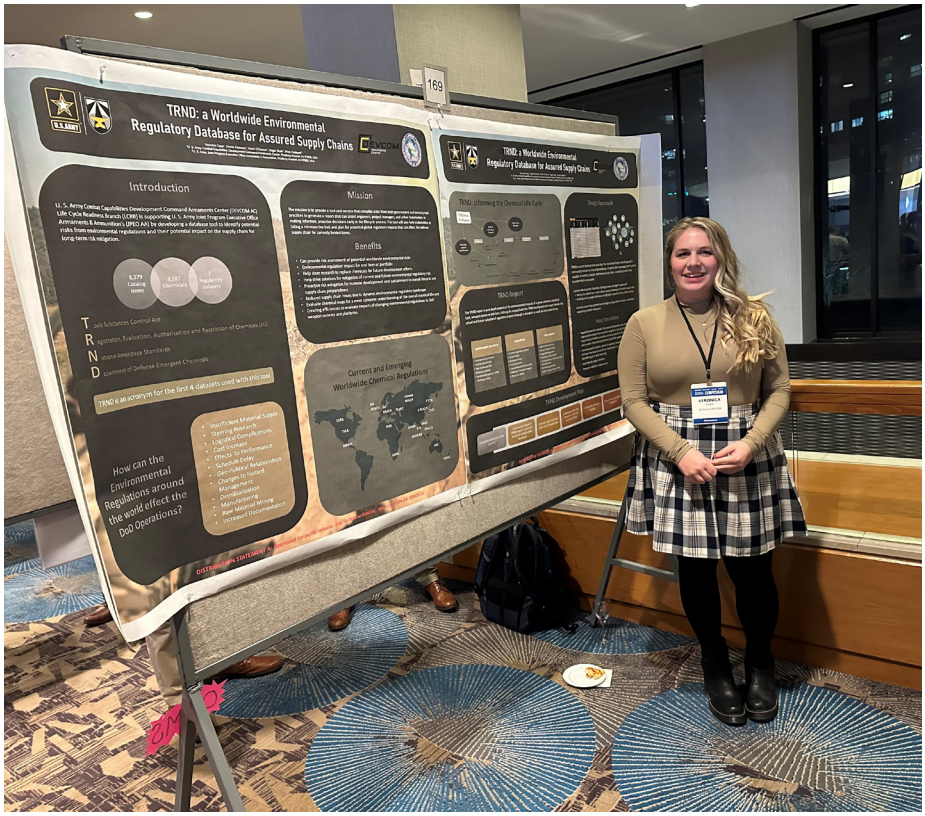
"I think COVID brought forth a lot of supply chain enlightenment," Copp said. "We're seeing there's other risks to the supply chain besides a global pandemic and there's things that we could be foreseeing and modeling that we haven't been tracking specifically."

One hot button item, she said, is per- and polyfluorinated substances (PFAS), a group of chemicals used to make fluoropolymer coatings and products that resist heat, oil, stains, grease and water, which has drawn public scrutiny and driven TRND database development. PFAS have become the poster child for the threat of environmental contaminants that can cause anything from an altered immune system to kidney and liver disease to cancer. A primary manufacturer of PFAS is 3M Co., who announced in December 2022 that they will exit the market by 2025 in order to avoid further liability. The Army uses PFAS in munitions parts and formulations, but it will take years and millions of dollars to try to find a replacement and requalify items.

"We want to get rid of our forever chemicals [in general]," Copp said. But certain PFAS are mission critical, ensuring materiel performs as intended. "With 3M leaving the PFAS market … they are a supplier and now we're going to have only a few smaller companies left," which could affect supply. So, she said, with political pressure to get out of the PFAS market, "What are our other options? What would lead us to another solution that we won't regret in the future?"

The TRND database tool generates an in-depth analysis report of the environmental impacts of a given chemical, chemical type, weapon system or end item, and details the actual and future potential of regulatory impacts through a domestic, as well as international, lens. Using the output from the TRND worksheets, assessments can be made about the environment and health (human health risk, bioaccumulation, permissible exposure limits); regulation (United States, EU, private industry); and path forward (short- and long-term solutions, drop-in chemical replacements and onshoring potential).

Before TRND, according to Copp, there wasn't a central location or database where data could be analyzed both "retrospectively" (with consideration of how past events or situations might affect future outcomes) and "prospectively" (accessing current data sets with consideration of or in preparation for future events). Engineers and program managers would be able to access the impact of emerging regulation and provide data and courses of action for a fact-based decision on mitigation by leadership. The response to emerging regulation could range from improved environmental practices to redesign of the item to eliminate the material of concern. In instances where no alternatives exist, the database will provide information to support a permitted, continued use request for specific applications of regulated materials in support of national security needs. One of the ultimate goals is for TRND



TRND-ING AT THE SYMPOSIUM

Veronica Copp stands with her poster outlining TRND capabilities and objectives at the Department of Defense Energy and Environment Innovation Symposium, held Nov. 28 through Dec.1, 2023, at the Crystal Gateway Marriott in Arlington, Virginia. (Photo courtesy of Veronica Copp, DEVCOM AC)

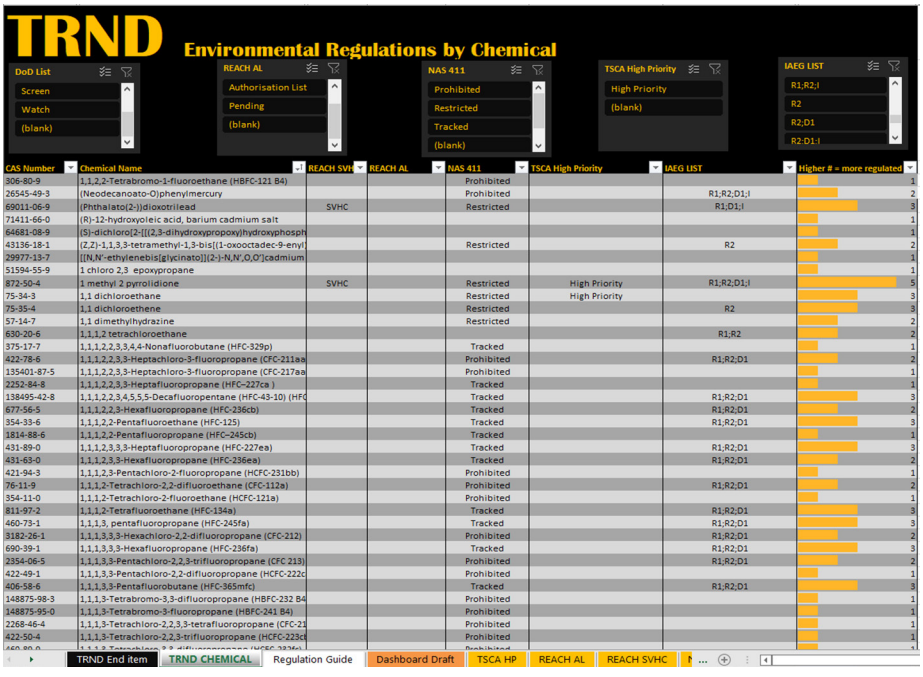
to be used as a tool early in the life cycle to help identify and access potential environmental regulatory risks during the development of new materials.

The TRND tool would compile data from both government and industry best practices to generate a report that can assist engineers, project managers and other stakeholders in making informed, proactive decisions early in the life cycle process—allowing for potential improvements to be identified and implemented—leading to reduction in a product's overall environmental impact.

Another big issue, Copp said, is hexavalent chromium, an industrially produced forever chemical used to protect Army vehicles, equipment and missile systems from corrosion; also known to cause cancer and other long-term health effects.

The Army is pursuing a number of heavy metal mitigation and replacement projects beyond hexavalent chromium (see "Heavy Metal—Banned" in the Fall 2021 issue of AL&T). A European Union hexavalent chromium elimination (memo) in March 2022 was another major driver of TRND development. "We're trying to get ahead of this," she said. "TRND will be useful in two ways, since it's retrospective, which is the easy part right now. But my team is also looking prospectively, and TRND has the ability to look at the current catalog."

The TRND workbook is broken down into two main interactive smart reports: The TRND "end item" is a retrospective search used to identify what current items and sub-components are regulated. And the TRND "chemical" is a sheet that can be prospectively used as a forecasting tool in the design and product development process. Currently, the tool is limited to chemical forecasting, but will expand to end items in the coming months.



EXAMPLE WORKSHEET

A TRND worksheet mockup showing environmental regulations by chemical. (Graphic by Veronica Copp, DEVCOM AC)

"When you're talking to the public or people who don't have a chemistry background, I feel like being able to link carcinogenic items, or something along those lines, with real world examples is really impactful," she said. "So, I've been bringing in some data from the EPA as well." This data includes information about chemical compositions, toxicity and the effects on drinking water, waste and wastewater.

Copp said with TRND, she's ultimately trying to get in the ear of research engineers and say: "Hey, I want you to start thinking about environmental regulations and how they're going to impact the material choices you make." By linking up with Army materiel engineers, she is hoping to bridge gaps and provide them with a tool where they might consider alternate choices and might say "maybe I don't want to use the next hexavalent chromium and replace it. Maybe there's a green alternative," said Copp. "We want to steer the research hoping that we can use TRND to influence research for greener alternatives."

AVOIDING REGRETTABLE SOLUTIONS

Copp is taking a holistic approach from the "ground to the round," she said, meaning from material in the ground to the end item, because everything that comes out of a gun is going to end up somewhere. So, she wants to build in a demilitarization thought process now, to avoid regrettable solutions later.

"We're trying to go about the development of these new energetic materials in a much more measured way that balances the safety of our warfighter mission goals but is also environmentally responsible." And

currently, she said, there is a lot of basic and advanced research being conducted regarding hexavalent chromium and corrosive coatings, especially in guns.

"When you think about acquisition, you've got a current problem right now, but any reflection on the catalog we're looking at in the best scenario five years, and that's very lofty—very, very lofty," she said. "I would say we're looking at a 10-to-15-year lag, so any heads up on research that we could get [is going to help]. If we are looking at trends maybe in Europe from the REACH, if we could get on that kind of schedule, we might be a little bit more competitive in a green way." REACH is a European Union regulation that affects the supply and use of substances and aims to ensure a high level of protection of human health and environment against harmful materials.

BUILT TO SERVE

While built to serve the munitions community, the preventative features of TRND hold promising potential for adaptation to serve other customers (government agencies, departments, industry) in the future.

In the short term, Hubbard said, "TRND provides the capability to rapidly search the JPEO A&A portfolio for critical chemicals and materials that are contained in fielded end items. And it enables JPEO A&A to respond to quick-turn information requests asking if certain chemicals are used in Army materiel." In the long term, TRND may evolve to include developmental items, and enable material developers to identify impacts from the rapidly changing environmental regulatory landscape—before a technology or end item transitions to a program management office and or program of record. "This could allow material developers to pivot to less hazardous, alternate chemicals/materials and mitigate risks before transition," he said.

Copp said 6.1 Environmental Basic Research funding was secured for TRND a year ago but will run out in June. She also applied for a grant from the DOD Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP)—the gatekeepers of environmental research, who steer the DOD's environmental research funding lines.

Each year the SERDP/ESTCP hold a symposium for all grant applicants, and at last year's Department of Defense Energy and Environment Innovation Symposium—held Nov. 28 through Dec. 1, 2023 in Arlington, Virginia—other project management offices and program executive offices outside of JPEO A&A were briefed on TRND and its benefits for potential use with their product or commodity areas.

"Our biggest goal going forward is to chemically map our items down to such an elemental level, so we can have the greatest impact and also avoid those supply chain issues from regulations," Copp said. "And we're also trying to see where we can make headway with onshoring the chemical production."

Copp and her team at the Armaments Center say they are working with chemists on building chemical mapping functionality into TRND to assess potential environmental regulatory impacts during the development of alternate synthesis of some energetic polymers and plasticizers, with cohorts across the Army, on better alternatives to synthesize these into working energetics to determine the "greenest route."

CONCLUSION

The goal of TRND is to identify potential threats to acquisition from increased regulatory scrutiny or perceived liability which may result in supply chain deficiencies and an inability of the Army and DOD to produce and field munitions.

Copp said TRND, which is still in the testing phase, is currently limited to Army partners, while efforts on design and enhancements continue. "Right now, it consists of taking current environmental policies and comparing those to chemicals, not Army or DOD catalog items yet," she said. "But in the next year, we're hoping to have a prototype out and available, on a wider scale."

"Is it going to be a perfect solution? Absolutely not," Copp said. "But I think it could help steer research away from those regrettable solutions."

For more information, go to the JPEO A&A website at ***https://jpeoaa.army.mil****.*

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PRACTICE ROUND
Special Forces Soldiers assigned to 10th Special Forces Group (Airborne) detonate a charge during training in Estonia in April 2023. The Army hopes to reuse munitions waste products within the organic industrial base. (Photo by Staff Sgt. Anthony Bryant, U.S. Special Operations Command Europe)

A GREENER ORGANIC INDUSTRIAL BASE

The Project Director Joint Services team turns waste into valuable products for sustainable munitions production.

by Gregory O'Connor

As industries continue to face shifting dynamics in international politics, there is increased pressure on sustainability, supply chains and the use of raw materials. Ammunition production in an environmentally sustainable manner is crucial in today's world. Therefore, it is essential to minimize the impact on the environment, manage supply chains and reduce reliance on materials from overseas.

By adopting sustainable production practices, the Army can organically increase the supply of critical chemicals and reduce the cost of waste disposal. One effective strategy to achieve sustainability in ammunition production is through byproduct synergy. This approach involves identifying and utilizing waste materials generated during the production process as raw materials for other industries or reworking the waste so that it can be reused as feeder stock within the Army's organic industrial base. By doing so, the Army can minimize waste disposal, increase supply readiness of critical chemicals and create a circular economy where materials are reused.

Through byproducts synergy, waste materials can be transformed into valuable resources, creating new opportunities for economic growth and innovation. For example, various waste chemicals are produced when manufacturing explosives and propellants; disposing of these waste streams can be a costly environmental challenge. The Army traditionally has relied on inexpensive chemicals sourced from outside the United States, some of which are used for producing explosives and propellants. However, concerns over supply chain issues and dependence on foreign sources have highlighted the need for

alternative solutions. The Project Director Joint Services (PD JS) team came up with a way to manage environmental and supply chain risks with one clever idea that focuses on the benefit of turning waste into valuable products.

To combat these challenges, the Army has invested in PD JS Life Cycle Pilot Process Program research, development, technology and evaluation funding to research and explore sustainable approaches. One such approach involves utilizing waste streams generated at government-owned, contractor-operated (GOCO) facilities to produce critical chemicals. These waste streams, which are byproducts of production, often contain chemicals that are a disposal challenge. Instead of disposing of these waste streams, the Army aims to chemically convert them into ingredients that can be used in the production processes within the facility or within DOD end items. This approach addresses the issue of costly waste disposal, ensures a reliable supply of critical chemicals onsite and reduces dependence on overseas suppliers.

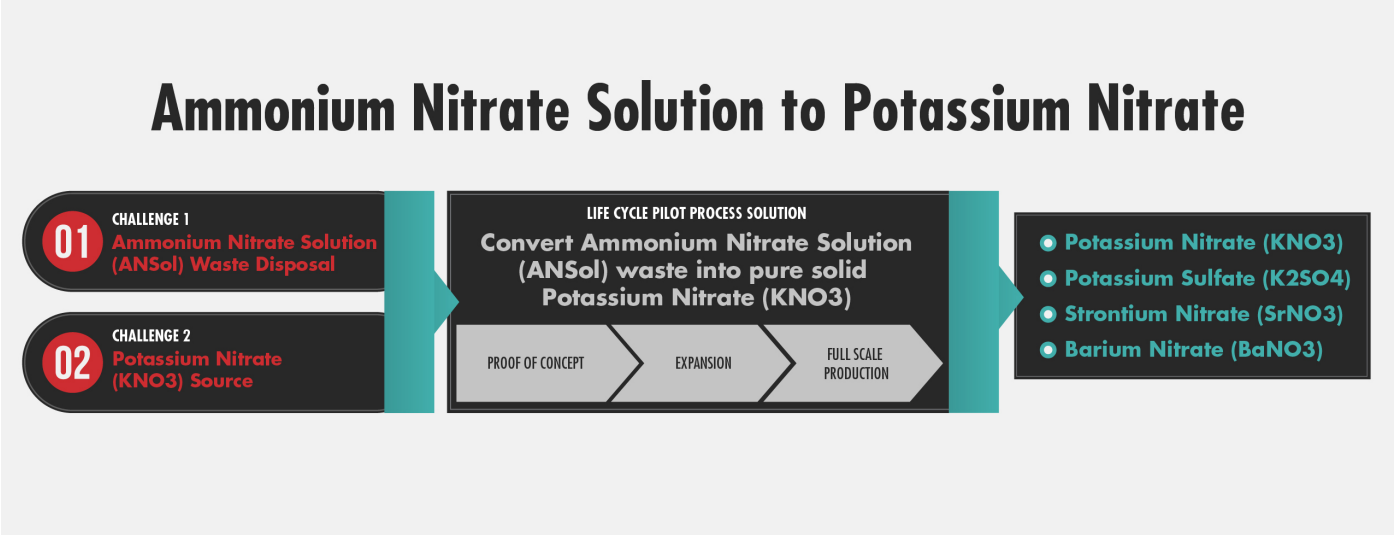
CONVERSION SUCCESS

This project specifically focuses on the conversion of ammonium nitrate solution, a waste product of explosives manufacturing, into potassium nitrate, a critical chemical used in some DOD end items. It is being conducted in multiple phases to demonstrate feasibility and provide insights for further development.

Through byproducts synergy, waste materials can be transformed into valuable resources.

Phase I aimed to prove the concept that ammonium nitrate solution can be chemically neutralized to yield potassium nitrate. The first phase involved small laboratory-scale experiments to determine

AMMO ON THE MOVE
The PD JS Life Cycle Pilot Process Program focuses on converting ammonium nitrate solution—a waste product of explosives manufacturing—into potassium nitrate. (Photo by Senior Airman Andrew Bertain)



THE CONVERSION PROCESS

Chart shows the conversion of Ammonium Nitrate Solution (ANSol) into Potassium Nitrate (KNO3), which addresses supply chain vulnerabilities and contributes to sustainability efforts. (Graphic by Gregory O'Connor, JPEO A&A – Project Director Joint Services and USAASC)

the optimal neutralizing agent and identifying the optimal waste stream feedstock for potassium nitrate manufacture. It also included laboratory-scale reactions to assess scalability and safety. The results of Phase I demonstrated successful synthesis of approximately 10 pounds of recrystallized potassium nitrate product from ammonium nitrate solution, along with the identification of the optimal process parameters.

Phase II focused on scaling up the process to produce 350 pounds of potassium nitrate. This phase involved utilizing a larger pilot-scale reactor and incorporating the potassium nitrate into a flash suppressant formulation. The resulting potassium nitrate product was characterized and compared to military specification requirements. The successful completion of Phase II led to the formulation of the potassium nitrate product into a flash suppressant. The findings from Phases I and II have paved the way for further scale-up and optimization. Phase III will develop an implementation plan for a larger scale process to maximize the value of waste streams in munitions production.

CONCLUSION

Overall, the project has successfully demonstrated the feasibility and merit of turning waste into valuable products within the Army's munitions production process. The successful conversion of ammonium nitrate solution into potassium nitrate not only addresses supply chain vulnerabilities but also contributes to sustainability efforts by reducing waste disposal, reliance on external sources and exemplifies the Army's commitment to a greener future. Additional work is currently underway analyzing the potential of processing ammonium nitrate solution into strontium nitrate and barium nitrate, as well as exploring other manufacturing waste streams for synthesis of potassium sulfate, all of which are chemicals used by DOD. By integrating environmental sustainability and waste reuse into GOCO production facilities, the Army can reduce its environmental footprint while becoming a more resilient organic ammunition industrial base.

For more information, contact Gregory O'Connor at ***gregory.j.oconnor.civ@army.mil*** *or 973-724-5008.*

GREGORY O'CONNOR is the government-owned contractor-operated modernization manager within the Project Director Joint Services. He did postgraduate work in systems engineering at Stevens Institute of Technology, holds an M.S. in environmental chemistry from New Jersey Institute of Technology and a B.S. in environmental chemistry from Delaware Valley University. He received executive certificates from the Massachusetts Institute of Technology, the University of Pennsylvania and Cornell University.

FROM OPEN TO CLOSED

Determining alternative technology solutions for the Army's disposal of excess, obsolete and defective munitions.

by James Terhune

The Department of Defense sustains combat readiness through safe and efficient disposal of excess, obsolete and defective munitions at a rate sufficient to keep pace with new generations of munitions and to control overall stockpile growth. Open burning and open detonation are critical capabilities to safely accomplish the mission at the required rate to effectively support combat readiness.

In open burning, materials are destroyed by self-sustained combustion after being ignited. In open detonation, explosives and munitions are destroyed by a detonation of added explosive charges. Open detonation is also used in emergency situations to destroy munitions and improvised explosive devices deemed unsafe to move.

Historically, the Army has relied on open burning and open detonation as the most inexpensive processes to demilitarize ammunition. The demilitarization enterprise enables readiness by reducing unserviceable and obsolete stocks in storage, freeing up critical storage space for joint service new production, war reserve and training munitions. Demilitarization, commonly called "demil," reduces life, safety and health risks by removing aging stocks from storage and increases depot capabilities by making room for good service stocks to be properly stored and aligned to operations.

Over the past 20-plus years, research, development, test and evaluation investments have been made to further the capabilities of alternative, closed disposal technologies with limited success. Two major projects are the Munitions Cryofracture Demilitarization Facility at McAlester Army Ammunition in McAlester, Oklahoma, and the Ammonium Perchlorate Rocket Motor Destruction capability at the Letterkenny Munitions Center in Chambersburg, Pennsylvania. A large portion of funds are used to maintain and improve the existing rotary kiln incinerators, which are the primary closed disposal capabilities used at various organic industrial base locations.

CALL TO ACTION

Previous regulations from the U.S. Environmental Protection Agency (EPA) provided a variance to the prohibition on the open burning of hazardous waste when no alternatives for the safe treatment of waste explosives existed.

According to the EPA, recent findings from the National Academies of Sciences, Engineering and Medicine (NASEM) have determined that safe alternatives are now available for many energetic or explosive waste streams. By waste streams, we mean the gases, liquids or solids that are the byproducts of a demilitarization treatment operation or processes. Because there are safe alternatives available and in use today that capture and treat emissions

ELIMINATING STOCKPILE
Open detonation of obsolete munitions at Tooele Army Depot. (Photo courtesy of Tooele Army Depot)

prior to release, regulations will be revised to promote the broader use of these alternatives, where applicable, through specified procedures to evaluate alternative treatment technologies.

In June 2022 and then updated in April 2023, the EPA initiated the Revisions to Standards for the Open Burning/Open Detonation of Waste Explosives, which proposed changes to open burning and open detonation permitting rules to increase control of air emissions through greater adoption and use of alternative technologies with the intent to further decrease or eliminate the use of open burning and open detonation. One of the proposed changes includes regulating the requirements for and parameters of an alternative technology evaluation for each permitted and interim open burning and open detonation facility.

REACTION RESPONSE

The demilitarization enterprise created an alternate technology evaluation and implementation strategy integrated process team (Alt Tech IPT) to respond to these future requirements. The Alt Tech IPT consists of the following government entities within the demilitarization enterprise: Product Director Demilitarization within the Joint Program Executive Officer for Armaments and Ammunition, Joint Munitions Command, Army Materiel Command, U.S. Army Combat Capabilities Development Command and consulting partners. The Alt Tech IPT will address the following objectives:

- Identify safe and viable alternate technologies that are applicable to the demilitarization stockpile and document a strategy and timeline for implementation at the demil depots to transition away from open burning and open detonation practices.
- Conduct a study that can be used by the demilitarization depots to comply with existing alternative technology evaluation requirements in facility Resource Conservation and Recovery Act (RCRA) and air permits.
- Meet, to the extent practicable, the guidelines in the EPA's proposed open burning and open detonation permit rule for the conduct of alternative technology evaluations, pending finalization.

OUTPUTS AND SOLUTIONS

Investing in alternative, closed disposal technologies for the organic industrial base addresses a mandate driven by the proposed EPA rule revision to maximize closed disposal technologies and minimize use of open burning and open detonation. To that end, the Alt Tech IPT will perform the following tasks over the next 18 months:

Stockpile analysis and waste stream characterization: The Alt Tech IPT will conduct a stockpile analysis of over 7,000 items and 320,000 short tons and make the determination whether any alternative technology identified by the assessment is applicable to stockpiled items.

Alternative technology identification and evaluation: This will leverage previously conducted studies such as the 2019 NASEM report and alternative technology reports prepared for Army facilities like Holston Army Ammunition Plant in Kingsport, Tennessee, and various demilitarization depots under the terms of their existing RCRA permits. The evaluation of potential alternative technologies will assess whether the technology is commercially available and being used successfully (either within or outside of the continental United States) and the likelihood of acquisition success. Alternative technologies that are currently under research, development, test and evaluation (RDT&E) efforts (organic or commercial) also will be considered. These activities are funded out of Product Director Demilitarization's RDT&E budget (line PE/SSN 0605805/F24). In addition, existing capabilities located at the organic depots will be evaluated, including currently active capabilities and those not in active use or those that have been laid away.

Applicability review: Any potentially viable alternative technologies identified will be evaluated against the stockpile for applicability and effectiveness using the criteria established per the stockpile analysis/waste stream characterization. Future reevaluation will be necessary as more data becomes available (i.e., comprehensive alternative technology analysis will be repeated every five years).

Explosive safety siting analysis: The evaluation will include a technology siting assessment that will identify possible locations at the demil depots for alternative technology construction and implementation. An explosives safety quantity-distance (ESQD) arc analysis is required for current explosive operations and storage locations, based on the maximum net explosives weight authorized at each facility. The ESQD arcs define the DOD's minimum acceptable levels of protection from intentional and unintentional detonations, which help minimize injuries to personnel not related to explosive operations and ensures the related explosives workers are properly protected during demil operations.

Acquisition strategy and implementation timeline development: Based on the resulting matrix of applicable technologies versus stockpile items, an implementation plan will be developed.

CLOSED DISPOSAL

Example of a Closed Disposal Technology at McAlester Army Ammunition Plant in Oklahoma. Pictured here are the McAlester Ammunition Peculiar Equipment (APE) 1236 Rotary Kiln Incinerator thermal treatment system and the Munitions Cryo-Fracture Demilitarization Facility, which prepares munitions for feeding into the APE1236 for demilitarization. (Photo by Brent Hunt, Tooele Army Depot)

This will include determining where alternative technologies will be installed and how the projects will be executed. Both an acquisition strategy and a funding plan also will be developed, and from this an implementation timeline will be established. Construction usually requires funding from DOD's Military Construction program and is a lengthy process to receive and implement. The demilitarization enterprise is requesting Procurement of Ammunition Army (PAA) funding on Product Director Demilitarization's EP1700 funding line during the recent fiscal year 2026-30 Program Objective Memorandum funding requests. An act of Congress would be required to allow PAA funds to be used for construction, alternate technology or otherwise.

CONCLUSION

In the 1980s, regulations allowed the permitting of open burning and open detonation to demilitarize munitions. On May 19, 1980, 45 Federal Register 33063-33285, page 33217, allowed the open burning and open detonation of waste explosives, within specified distance and weight limitations, during an interim status permitting period. On Dec. 10, 1987, in 52 Federal Register 46.946, 46.949-50, 46.957-58, the EPA concluded that facilities conducting open burning and open detonation of waste explosives would receive permits under the RCRA Subpart X provisions as miscellaneous units. Since then, DOD has been proactively reducing the number of permitted open burning and open detonation units from 114 to 34, a 70% reduction. Moreover, DOD facilities reduced the quantity of munitions treated by open burning and open detonation by 58% over the past 20 years.

The demilitarization industrial base is currently facing both technological and funding constraints in the implementation of additional closed disposal technology solutions. By developing a comprehensive acquisition strategy and funding plan, it will enable Army leaders to make informed decisions on the necessity and urgency of funding future demilitarization technology projects.

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EVANGELINA TILLYROS

COMMAND/ORGANIZATION: Project Director Joint Services, Joint Program Executive Office for Armaments and Ammunition

TITLE: Acquisition manager

ACQUISITION CAREER FIELD: Contracting

YEARS OF SERVICE IN WORKFORCE: 13

DAWIA CERTIFICATIONS: DOD contracting professional

EDUCATION: B.S. in business management with a concentration in finance, Monmouth University

AWARDS: 2020 Gold Eagle Award for Contracting Excellence; Secretary of the Army Exceptional Support of AbilityOne Program award (2017); Civilian Service Achievement Medal (2015)

NEVER STOP ASKING QUESTIONS

Learning a new job is challenging, especially in the field of contracting—with a lot of new information to take in and process in a short amount of time. Much of what's learned is applied gradually, but it takes years of practice to achieve proficiency. After more than a decade in the field, Evangelina Tillyros can finally say she is completely comfortable navigating all the processes and finding solutions to complex contracting issues.

"A close friend of mine worked for the Army and often expressed how contracting was the most complex and sometimes painful aspect interfacing his job," she said. "I couldn't be more intrigued that my friend, who I think of as a genius, found a career field 'complex.' " She then applied for a contract specialist position at Army Contracting Command – New Jersey (ACC-NJ) at Picatinny Arsenal and joined the Army Acquisition Workforce in May 2010. "I didn't agree [with my friend] about the pain, but it was much more difficult than I thought," she said. "Once I started getting a feel for how to navigate through policy, I was hooked."

As acquisition manager for the Project Director Joint Services (PD JS) Business Division within the Joint Program Executive Office for Armaments and Ammunition (JPEO A&A), Tillyros is responsible for directing, developing and controlling the acquisition activities for a portfolio of over 150 active projects valued at $3 billion in fiscal year 2023, and an estimated $6 billion in programming activities through fiscal year 2028.

She also manages a team of four acquisition analysts, along with specialists deployed within multiple PD JS integrated teams, and ensures that they achieve the highest degree of effectiveness and efficiency for PD JS contracts. This, she said, enables the office to meet cost, schedule and performance goals in support of JPEO A&A as the single manager for conventional ammunition.

"I love that my work contributes to the sustainment and success of the AAPs [Army ammunition plants]," she said. "To me, it doesn't get more critical than that. My greatest satisfaction in being part of the Army Acquisition Workforce is that there are endless opportunities to grow and learn."

Tillyros said JPEO A&A offers a variety of lunch and learn training sessions that can be accessed at any time. "As our world changes, the laws and practices applied to federal contracting have to keep up. We are not in danger of running out of new things to learn anytime soon."

"People think I have the coolest job, and I do! I get to visit Army ammunition plants to see our projects in development and in completion," she said. "It's one thing to prepare documents discussing why a new acid facility is needed, but the experience becomes meaningful when you step inside a particular facility to experience actual conditions workers use to operate within. At Project Director Joint Services, we are blessed with the task to make those AAPs better. Better is safer for workers and much more efficient. I am genuinely so proud of the work my team executes at PD JS."

HANDS ON EXPERIENCE

Tillyros firing an M72 LAW Shoulder Launched Munition at Nammo Defense Systems in Mesa, Arizona, in October 2015. She said the experience becomes more meaningful when you can see firsthand how the product is developed and learn how it works. (Photo courtesy of Evangelina Tillyros)

Tillyros visited the Iowa Army Ammunition Plant this year to watch the load, assembly and packing process for the ammunition projectiles. "It was an incredible experience to travel the assembly line along with the ammo as it is filled with explosives and on to the next step," she said.

An early and important point in her career was when she was asked to mentor someone for the first time on how to prepare and execute an undefinitized contract action for the LightGuard Mercury System (a threat-detection system). "The challenge was that I had to teach someone a contracting procedure I wasn't educated on, either. I didn't want to fail my team by saying I couldn't do it, so I set out to gather as much research as I could to make sense of it to myself and to my mentee." According to Tillyros, that mentee shaped how she trains people even to this day.

"They had a lot of questions as to why we would do things a certain way, so we looked up every question together and wrote down the references to back up our procedures." Tillyros said it was a great experience for both her and her mentee because she learned procedures for contracting all over again in a more thorough way by having to teach it to someone else. "My specialists would ask, 'How do you know all of this?' The answer was always the same, never stop asking questions and never stop seeking to understand."

Training is another way Tillyros has been able to learn more by asking questions. She recently completed the Lean Six Sigma Green Belt Class and the Civilian Education System (CES) Advanced Part 1 training and describes CES as phenomenal because it discussed different types of teaming methods and management approaches. "Some I was aware of and others not as much," she said. "I highly recommend it to everyone because the approaches discussed are relevant for all levels of the career ladder."

She believes that in management, the road to success is not just the hands-on experience and training, it's the ability to "put your people first." Having been a team lead in multiple organizations, she understands the value of having a cohesive team that is comfortable together and asking questions of each other. "We all have questions, but we need to feel safe asking them," she said. As a team lead, Tillyros's primary responsibility is to support her team by encouraging them along their "roads to success."

"My responsibility is to ensure my team can execute their work in the most efficient way possible," she said. "To do this I provide dedicated training for tasks to be performed, on the tools we utilize, and to help them when they are stuck with a problem."

Also, she said, as a team "we don't resonate with what went wrong or where to place blame, we focus only on the solution. When my team is successful it leads to organizational success. Being able to motivate and develop the people we are blessed to lead is a great privilege."

Tillyros said both in and outside of work she is known to be a perfectionist who goes overboard with small projects for fun like cooking, gardening or home remodeling. "I once was so determined to make croissants from scratch, I went through 10 pounds of butter before I got it right," she said. "The commonality with my work is similar, I won't give up until I get the result I am satisfied with."

—CHERYL MARINO

RESCUE POWER
The H2Rescue, a zero-emission, hydrogen fuel cell-powered emergency vehicle, can travel 180 miles to an area experiencing disaster. Once on site, the vehicle can provide heat, water and 25 kilowatts of power for up to 72 hours. (Photo by Kaley Skaggs, U.S. Army ERDC-CERL)

H2RESCUE MISSION

New hybrid H2 emergency vehicle brings the Army closer to reaching net-zero greenhouse gas emissions by 2050.

by Rebecca Wright

Significant shifts in weather patterns can eventually impact the Earth's habitat and civilization. As climate change continues to pose a threat to our planet, DOD is recognizing actions that can be implemented to help mitigate its negative effects. One such action is the design and development of the H2Rescue—a zero-emission, hydrogen (H2) fuel cell-powered emergency vehicle that will provide disaster relief while also reducing greenhouse gas emissions.

The H2Rescue vehicle was developed in partnership with the U.S. Department of Energy (DOE) – Hydrogen and Fuel Cell Technologies Office; U.S. DOE – Vehicle Technologies Office; U.S. Army Combat Capabilities Development Command Ground Vehicle Systems Center (DEVCOM GVSC); U.S. Department of Homeland Security's Science and Technology Directorate; Federal Emergency Management Agency; U.S. Naval Research Lab; and Accelera by Cummins (an energy technology company), with the U.S. Army Corps of Engineers' Engineer Research and Development Center Construction Engineering Research Laboratory (ERDC-CERL) serving as the technical lead.

According to the United Nations, climate change refers to the increasing changes that are happening to our planet over a period of time. These changes include rising sea levels, acceleration of melting ice in the Arctic, changes in temperature and wind, extreme weather patterns and an increased likelihood of natural disasters. While some contributors to climate change are caused naturally (solar activity, volcanic eruptions), most changes are attributed to human activities, such as burning fossil fuels like oil, gas and coal. By burning fossil fuels, greenhouse gases are generated, which then trap the sun's heat around the Earth causing global temperatures to rise. Carbon dioxide and methane are the primary greenhouse gases responsible for climate change. These gases are created by generating electricity, heating buildings and driving vehicles.

Transportation methods such as vehicles, ships and aircraft rank as some of the top leading sources of greenhouse gas emissions. Passenger vehicles, including cars and trucks, make up 41% of carbon dioxide emissions by burning petroleum-based fuel. Despite comprising only 4% of the U.S. passenger vehicles, trucks contribute to 23% of the greenhouse gases released into the atmosphere—and the U.S. Army is not exempt from contributing to these numbers.

The U.S. Army owns and operates a large fleet of various types of vehicles, including tanks, armored trucks and heavy equipment movers. According to a July 2021 Government Accountability Office report, the Army currently has over 242,000 vehicles in its fleet. As part of its 2022 Climate Strategy, the Army is aiming to reach net-zero greenhouse gas emissions by 2050. One of the strategies to reach this goal is by fielding all-electric vehicles—beginning with fielding hybrid tactical vehicles by 2035 and fully electric tactical vehicles by 2050.

AN ECO-FRIENDLY RESCUE

The consequences of climate change include extreme weather patterns and catastrophic storms, such as hurricanes, wildfires and dangerous flooding. The U.S. Army Corps of Engineers acts in response to these occurrences to deliver disaster relief.

Nicholas Josefik is an industrial engineer with ERDC-CERL and has been the technical lead on the H2Rescue project since October 2020. "We saw a need with all the natural disasters and emergency events happening and we wanted to improve the capabilities of some emergency resources," said Josefik. In 2019, what began as a brainstorming session on how to improve emergency response capabilities, ERDC-CERL, DEVCOM GVSC and DOE's Office of Energy Efficiency and Renewable Energy came up with the concept of H2Rescue. "When we came up with the idea, there [were] the California wildfires going out west, there were a couple of hurricanes in the southeast and we knew that big swaths of the U.S. were having these natural disasters [and] that customers didn't have power, water and were just devastated," Josefik said.

H2Rescue has the capability to travel approximately 1,500 miles on a single fuel-up when the hydrogen is used solely for driving, or it can travel a shorter distance and utilize some of the hydrogen to export power to a disaster-stricken location. For instance, when the H2Rescue covers a 180-mile round trip, the vehicle also has enough hydrogen fuel to provide 25 kilowatts of power for up to 72 hours. Once onsite, the vehicle can provide power, heat and water. The vehicle boasts a climate-controlled box bed that can serve as a mobile command center or a warming and cooling center. Additionally, the vehicle's fuel cell can produce water that, once treated, can be used in an emergency. When describing a recent field demonstration of the vehicle, Josefik said, "It drove 180 miles and then we parked it. We started exporting power and exported at 25 kilowatts for 72 hours. That's about enough to power 15 homes for three days straight."

THE HYDROGEN HUB

As a nonpolluting alternative to methane, hydrogen is the most abundant element on Earth and is estimated to make up 75% of the universe's mass. As vehicles powered

GETTING OUT OF A JAM

Carbon dioxide and methane are the primary greenhouse gases responsible for climate change. Passenger vehicles, including cars and trucks, make up 41% of carbon dioxide emissions. (Photo by Luigi Alvarez, Pexels)

by gas and diesel expel harmful pollutants into the atmosphere, a major source of greenhouse gases, hydrogen offers a cleaner alternative. When hydrogen is used in a fuel cell, it produces only water and air. A fuel cell is an electrochemical device that generates electricity most often by using hydrogen and oxygen.

"A lot of people don't know about fuel cells," said Josefik. "A fuel cell is an electrochemical reaction, so it's like a battery." Fuel cells do not need recharging like standard batteries; if a fuel source, such as hydrogen, is provided the fuel cell will continue to produce electricity.

"There's no combustion," he added. And "they're typically twice as efficient as combustion engines. So again, even if we use the same amount of fuel, we'll probably get to go about twice as far," Josefik said. "The fuel cell is used to drive the vehicle and we eliminated the need to bring combustion generators to the emergency; the vehicle is the generator. We have multiple electrical outlets all over the vehicle. So, you can just plug your equipment into H2Rescue."

The H2Rescue vehicle, which can carry up to 176 kg of hydrogen within its 18-tank system, is expected to conserve approximately 1,825 gallons of fuel per year and is estimated to reduce greenhouse gas emissions by 2.5 metric tons per year.

Hydrogen is currently available in all 50 states from most compressed gas distributors. This availability will continue to expand with new funding provided through the Bipartisan Infrastructure Law, signed in November 2021. Included in the Bipartisan Infrastructure Law is the Regional Clean Hydrogen Hubs Program (H2Hubs), which includes $8 billion to form the foundation of a national hydrogen network. Under the authority of the DOE, the H2Hubs program will establish between six and 10 clean hydrogen hubs in the U.S. The hydrogen hubs will produce, store and distribute hydrogen in an effort to create a new form of readily available clean energy. This entails forming a network of producers and consumers along with creating connective infrastructure to distribute hydrogen that can be used to power vehicles, generate electricity and provide heat to homes and businesses.

AN H2 FUTURE

The H2Rescue vehicle has been demonstrated multiple times in 2023 and will have additional showcases across the U.S. in 2024. Although H2Rescue is still in the prototype phase, the team is already envisioning future enhancements. This includes upgrades to the current water production system with an aim to purify the water to levels suitable for human consumption. "The fuel cell produces water, so we can produce between 200 and 400 gallons of water on a single fuel up," said Josefik. "Right now, you could use it for washing. …We are looking into a device to polish that water to bring it back to potable."

While providing disaster relief is the current focus of the H2Rescue vehicle, the capability to provide future support to the Soldier is a potential outcome. "The reason we chose the emergency disaster area is because it's a little easier to demonstrate that in our country. If we can prove it here, then we can harden it to be for that forward operating [area]. We have a long-term goal of being able to support that effort," Josefik said. "We have nontactical vehicles in the military. …Right now, in the forward operating [areas], you bring in trucks, you trailer in combustion generators to produce energy, and then you bring in tankers worth of fuel. This is the same application. It could be applied in the forward operating base because instead of having to bring in those three different pieces of equipment, now you drive your vehicle to the location and your vehicle is your power generator."

CONCLUSION

As the world continues to struggle with the threat of climate change, the military finds itself on a new battleground as the threat of global warming continues to rise. The military is adapting to a new environment where extreme weather patterns and more frequent natural disasters threaten future operations; and the continuance of emitting greenhouse gas emissions will only intensify the growing problem.

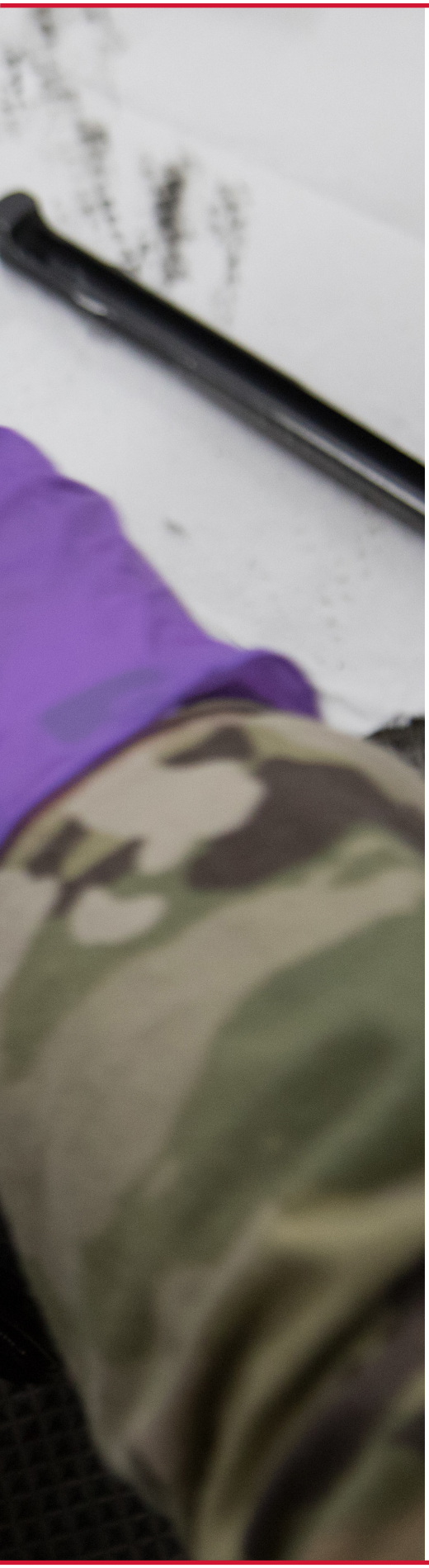
The H2Rescue vehicle aims to provide aid in disaster-stricken areas, but it will do so without consuming the same amount of energy as a standard vehicle, and without expelling greenhouse gases into the atmosphere. Hydrogen has potential to transform the energy pipeline with minimal impacts to the environment. When compared to traditional fuels, hydrogen holds versatility and the capability to transform energy consumption, making it a compelling choice for a cleaner and more sustainable future.

For more information, contact Nicholas Josefik at ***nicholas.m.josefik@usace.army.mil****.*

REBECCA WRIGHT is a writer and editor with Army AL&T and the U.S. Army Acquisition Support Center at Fort Belvoir, Virginia. She has over 14 years of experience writing and editing for the Department of Defense and the Department of Justice.

WEAPONS TEST

For decades, petroleum-based CLP products were standard. As biobased options began entering the market, the DOD Environmental Security Technology Certification Program initiated a project with the DEVCOM Armaments Center to evaluate commercially available biobased CLP products. (Photo by Sgt.1st Class Mary Katzenberger, 3rd Expeditionary Sustainment Command)



A GREEN TECH *EASY BUTTON*

Utilizing the DOD Sustainable Technology Evaluation and Demonstration program to reduce burden and clear obstacles for identifying, validating and acquiring sustainable technologies.

by David J. Asiello

As we learn more about the negative health, safety and environmental impacts or general inefficiencies of legacy technologies, the acquisition, logistics and technology community is under increasing pressure to transition to more sustainable alternatives. Acquisition and workplace safety laws, environmental regulations, requirements to maximize budget resources and the critical need to protect the health and safety of personnel all provide impetus and are imperative for this change. Additionally, the necessity to ensure a resilient force and logistics infrastructure necessitates a more sustainable footprint. Consequently, acquisition personnel are directed to purchase more sustainable products, logistics personnel are directed to supply such products, and technology personnel are directed to identify and validate such products.

While the benefits of transitioning to sustainable technologies are clear (e.g., improved performance, reduced toxicity and hazards, less waste, lower liabilities and costs, resource efficiencies, reduced supply chain disruptions), navigating the path from need to resolution can be long and complicated. Even when a sustainable technology need is known, identifying products that meet end-user requirements necessitates market research, industry coordination and technology evaluation that are beyond the available staffing, expertise or budget of many organizations.

The DOD Sustainable Technology Evaluation and Demonstration (STED) program provides a ready and agile solution that addresses needed actions in all three areas:

acquisition, logistics and technology. Led by the Office of the Assistant Secretary of Defense for Energy, Installations, and Environment, the STED program works with DOD components and other federal agencies to reduce the burden and obstacles preventing the validation and transition to more sustainable commercially available technologies.

ASSISTING TECHNOLOGY

The STED program supports all DOD components to identify sustainable technology need areas and validate sustainable technology performance and cost effectiveness of alternatives. The program works with components to determine appropriate demonstration sites and performance requirements, identifies commercially available candidate technologies to demonstrate in DOD operations and coordinates with component headquarters, program and installation offices and regulatory agencies to secure all necessary approvals prior to demonstration. Technologies are supplied by the STED program during the demonstration period at no cost to the participants. Users are asked to utilize the products in their daily operations and provide feedback on the technologies' performance compared with the currently used product. The program analyzes the performance and return on investment data, then generates a summary report made available to all DOD personnel via the DENIX website (**https://www.denix.osd.mil/spc**).

ASSISTING LOGISTICS AND ACQUISITION

Once technologies are successfully validated, they must be readily available to DOD personnel via the government supply system. The process of getting items onto a federal schedule or contract and assigning or creating National Stock Numbers can be lengthy and complex. To facilitate the process, DOD and the General Services Administration (GSA) signed a memorandum of understanding under which the GSA will use the STED program product performance and pricing information to streamline the acquisition process. This can make proven sustainable technologies more readily available to DOD and other federal agencies.

The STED program also supports a secure supply chain and material availability by including domestically sourced and manufactured products in the demonstrations. Beyond product availability, the STED program demonstrations assist supply functions by validating technologies that reduce the logistics tail by lessening required quantities, load weights and associated warehouse management requirements (i.e., storage needs based on flashpoint and chemical characteristics). In addition to supply functions, the program demonstrations benefit maintenance operations by validating sustainable technologies—such as biobased functional fluids and sorbents (materials that absorb liquids or gases)—that improve operational performance and reduce maintenance time while improving worker health and safety.

Once a sustainable technology is validated and available for purchase, there may still be additional barriers to acquisition. These may include pre-existing standards,

TAKE AIM

A sniper rifle atop a recycled textile sorbent mat during a demonstration of the DOD STED program at Fort Moore, Georgia. (Photo by George Handy, Noblis)

DEMONSTRATION SCOPE

The DOD STED program can facilitate the demonstration of a broad range of commercially available technologies that offer a performance and sustainability benefit to DOD. These can include technologies that offer safer, more resource efficient or more durable alternatives or otherwise generate less negative health and environmental impacts than currently utilized technologies.

To date, the DOD STED program demonstrations have ranged from biobased weapons lubricants, functional fluids, sorbents, tires and dust suppressants to energy-efficient door systems and access controls, PFAS-free disposable food ware, light-emitting diode (LED) alternatives to chemlights, and Safer Choice-certified sidewalk deicers. The program is not limited to these categories and is actively seeking to expand into new warfighter and installation need areas.

organization or locality. As an Office of the Secretary of Defense-level program, STED can coordinate with necessary parties once an acquisition barrier is identified to resolve the issue and facilitate the transition to more sustainable technology alternatives.

A REPRESENTATIVE EXAMPLE

A recent example of how the STED program can benefit the transition to sustainable technologies within the acquisition, logistics and technology community can be seen in the latest U.S. Army Armaments Center revision of the MIL-PRF-63460 specification for weapons cleaner, lubricant and preservative (CLP) products. For decades, petroleum-based CLP products were standard and it was unknown whether a less hazardous biobased alternative could meet the demanding performance requirements in the military specification for a single product (i.e., cleaning, lubricating and preserving). As biobased options began entering the market, the DOD Environmental Security Technology Certification Program initiated a project with the Armaments Center to evaluate commercially available biobased CLP products. The Armaments Center continued to work with manufacturers to qualify products to the specification, creating the new product designations of Type A (traditional nonbiobased products) and Type B (biobased products).

The STED program conducted demonstrations of the newly qualified Type B CLP products at several Army, Air Force, Marine Corps and Navy installations. User feedback uniformly noted significant performance improvements in carbon removal, lubrication and weapon reliability, while reducing the amounts of product and cleaning time required, noxious odor, waste and smoke generated during weapon use—thereby offering several cost, safety, labor and performance benefits. Following the demonstrations, the Armaments Center issued Revision G to the specification. The revision removes the traditional nonbiobased Type A products and requires all qualified CLP products to contain a minimum 33% biobased content. This milestone validates the high-performance capabilities of biobased products to meet a combat tactical specification and provides enhanced lethality with a more sustainable technology.

CONCLUSION

The STED program supports department-wide transition to sustainable technology alternatives to help support operational readiness and improve mission capabilities, while improving the health of personnel and the environment. By validating performance and cost effectiveness of these technologies during DOD operations, ensuring availability in government supply and addressing barriers to acquisition, the program supports DOD component requirements and lowers the obstacles to commercial technology transition.

*For more information, go to **https://www.denix.osd.mil/spc** or email **osd.mc-alex.ousd-a-s.mesg.dod-sted-program-mbx@mail.mil**.*

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A CLIMATE **RESILIENT** ARMY

Huntsville Center is focusing on climate change impacts in acquisition strategies, planning and infrastructure upgrades.

by Holly DeCarlo-White

Public concern in America to "do something" about the deteriorating conditions of our water, air and land led to the creation of the U.S. Environmental Protection Agency during the 1970s. Since its beginning, U.S. Army Engineering and Support Center – Huntsville, an entity of the U.S. Army Corps of Engineers, has been invaluable in managing environmental projects and programs nationally—without any geographical constraints that state and regional offices hold. To ensure its support to the Army is most efficient, Huntsville Center in Alabama is also focused on improving the acquisition process.

"The Huntsville Center helps the Army to find paths of execution to implement resiliency requirements," said Jonathan Winkler, chief of the Energy Division at U.S. Army Engineering and Support Center – Huntsville.

Huntsville Center's main focuses are environmental cleanup including ordnance and chemical warfare materiel removal; installation support to facilities and medical facilities for repair, maintenance and acquisition; energy conservation, reduction and contracting; systems engineering and construction for ballistic missile defense, munitions production and chemical demilitarization.

"We support a multitude of programs such as the planning and design for the Energy Resilience and Conservation Investment Program (ERCIP). The Army's focus has been the implementation of microgrids for installation resilience," Winkler said. Microgrids

SUN ENERGY

An Energy Resilience and Conservation Investment Program solar microgrid project at Fort Hunter Liggett, California, is managed by the Sacramento District. A fiscal 2016 ERCIP project added additional rooftop solar panels and a second battery energy storage system. (Photo by John Prettyman, USACE)

FUEL CELL ENERGY

The Department of Energy awarded grants to Fort Knox for the next phase of energy resilience. The new fuel cell technology, which has yet to be designed or developed by engineers in the Directorate of Public Works' Energy Program, will connect to existing energy systems and increase Fort Knox's energy resilience. (Photo courtesy of Fort Knox News)

use controls to manage multiple local electrical system generation sources. They can provide power in the event of an emergency, operating independently from the main grid, and provide grid services, like frequency regulation, to the local utility provider, which saves on cost.

ENERGY SAVINGS PERFORMANCE CONTRACTS

With a history of pioneering capabilities, serving as a testing ground for new programs, technology, new contracting vehicles and process improvement, Huntsville Center is recognized as the Army's expert in energy savings performance contracts (ESPCs). ESPCs are unique in that they enable the direct partnership between federal agencies and energy service companies so that agencies can procure energy savings and make facility improvements via alternative financing from the private sector. This is important because without the need to tap into funds from the capital budget or obtain special appropriations from Congress, infrastructure improvements and new efficiencies that support the warfighter and meet energy and environmental mandates can be executed faster.

"Energy Savings Performance Contracting is a contract vehicle that leverages private sector capital investment to implement energy conservation measures (ECM). The energy service company that implements the ESPC is paid back for their capital investment through the funds that are saved resulting from the implemented ECMs," Winkler said, adding that the contract period may be up to 25 years.

In support of the Army Climate Strategy, ESPC assists installations in reducing energy and water use, as well as carbon and greenhouse gas emissions. The ESPC program encompasses 114 active projects and $2 billion in capital investments. In fiscal year 2022, ESPC verified savings were $127 million, with a 305 million total kilogram CO_2e (carbon dioxide equivalent)

WORKING TOWARD COST REDUCTION

Workers install portions of an 8.5 megawatt-per-hour battery system at Fort Carson, Colorado. Huntsville Center's Energy Savings Performance Contracting program coordinated the project, designed to reduce peak electricity use costs, especially during the summer cooling season. (Photo courtesy of U.S. Army Engineering and Support Center – Huntsville)

reduction. The average ESPC project capital investment amount is approximately $20 million worth of infrastructure improvements, and Winkler said that amount has been increasing over the years.

The energy service company performs operations and maintenance on major systems, allowing the limited resources of the Department of Public Works to be spent on other activities, and garrisons can appropriate funds on mission critical requirements. While energy conservation measures per installation may vary, they typically include energy management systems; lighting; steam distribution system repair; heating, ventilation and air conditioning (HVAC) systems; boiler repair, replacement or efficiency controller; and water and wastewater treatment plant pumps and motors.

ESPC project savings are cumulative, creating savings for the installation throughout the project contract period and often replacing equipment near the end of its service life with higher efficiency energy solutions. Cost savings are calculated by the measurement and verification activities under the Federal Energy Management Program.

INSTALLATION IMPACTS

In 2023, the ESPC program awarded Fort Knox in Kentucky with Phase 2 and a capital investment of $13.1 million. Energy conservation measures included HVAC controls and mechanical upgrades, plant operation, lighting improvements, building envelope upgrades (air sealing measures such as windows and doors) and refrigeration upgrades. A guaranteed savings of $29.3 million over the 22-year performance period. Fort Knox was one of 19 federal agencies to receive a portion of a $28.1 million grant awarded by the Department of Energy's Federal Energy Management Program to fund two new resilience energy conservation measures: the 800-kilowatt natural gas fuel cells and a 1,750-kilowatt-hour battery energy storage system to store excess

energy from renewable sources for backup power and energy demand management. According to the Federal Energy Management Program website, the expansion will lead to electricity savings growing to 9% and energy cost savings to 11%. Expected greenhouse gas emission reductions will rise to 5.25%.

The Department of Energy's Office of Energy Efficiency and Renewable Energy determined in 2020 that Fort Bliss, which encompasses more than 1 million acres of land across Texas and New Mexico and houses approximately 80,000 military and family members, needed upgrades. Its determination paper proposed work in three areas: lighting improvements, water resilience and energy storage. The post has over 43,000 light fixtures, and 102 of its buildings are designated as critical or uninterruptible for power. An ESPC task order was awarded in 2023 with a capital investment of $7.3 million. Energy conservation measures include interior and exterior lighting with guaranteed savings in the first year of $625,000.

ESPCs are unique in that they enable the direct partnership between federal agencies and energy service companies.

"The program is working with other garrisons in the Army to develop projects to improve efficiency and improve resiliency," Winkler said. "Some critical areas include utilizing third party financing to support its organic industrial bases, which supports DOD and our allies across the globe."

The ESPC program also supports outreach and training events for the Army by holding an annual ESPC and Utility Energy Service Contract (UESC) workshop. Last year's workshop, in August 2023, focused on industry trends and innovations in ESPCs and UESCs. Around 300 attendees included leadership from the Council on Environmental Quality within the Executive Office of the President, Deputy Chief of Staff of Army (G-9), Deputy Assistant Secretary of the Army for Energy and Sustainment, Army Materiel Command, Installation Management Command and executives from energy service and utility companies to name a few. During the forum attendees shared information, experiences and lessons learned on past and ongoing ESPC projects.

A Utility Energy Service Contract is a limited-source acquisition between a federal agency and serving utility for energy management services, including

MAJOR UPGRADES

The solar array at the alternative energy corridor at Tooele Army Depot in Utah is an Army Energy Conservation Investment Program project. The 429 solar dishes provide 1.5 megawatts of electricity, approximately 30% of the depot's annual electric energy need. (Photo by Kathy Anderson, Tooele Army Depot)

energy and water efficiency improvements and energy demand reduction.

The UESC program awarded two task orders for Fort Irwin, California, in fiscal year 2022 and 2023, which, Winkler said, will not only create more than $7.8 million in annual energy savings but will also ensure Fort Irwin's energy resiliency and security.

"Fort Irwin is currently fed from one single 115 kV electric distribution line and relies on truck delivery of liquefied petroleum gas (or propane) for its heating and operational requirements. This has created substantial energy vulnerabilities, exacerbated by its remote desert location, which ultimately jeopardizes the Army's training mission," Winkler said.

This project, valued at almost $188 million, provided for the implementation of about 22 miles of natural gas pipeline and 16 megawatts of natural gas generation, solar photovoltaic, microgrid, a battery energy storage system, lighting, HVAC, boiler and chiller upgrades and a utility monitoring and control system.

POWER THROUGH WIND

One of two wind turbines stands next to one of its many solar installations on Fort Buchanan, Puerto Rico. The two wind turbines will produce an estimated 5% of the energy consumed by the installation. A total of 21,824 solar photovoltaic panels will produce about 5.5 megawatts of power, which is at least 60% of the installation's current power demand at its peak production. (Photo courtesy of U.S. Army Engineering and Support Center – Huntsville)

"These energy conservation measures will give Fort Irwin the capability to produce up to 85% of all electrical demand onsite without dependency on the local utility," Winkler said.

CONCLUSION

The long-term strategy and goals for the Army are outlined in the 2022 Army Climate Strategy. Federal Acquisition Regulation 23.205 states that agencies should make maximum use of the authority provided in the National Energy Conservation Policy Act to use energy savings performance contracts to reduce energy use and cost in facilities and operations.

"The Army in 2024 has an added focus regarding Deep Energy Retrofits [DER], and Huntsville Center is working with the Army to integrate DER into ESPC and UESC projects," Winkler said. DERs are energy conservation measures that lead to overall emissions performance in a building to achieve net-zero or near net-zero emissions, defined in the Energy Independence and Security Act of 2007, by 2030.

Stakeholders should reach out to Huntsville Center to discuss the possibilities to improve efficiency in energy, munitions or any other program service the Huntsville Center supports, Winkler said. "Huntsville Center is a key strategic partner for the Army and all of DOD serving as an execution agent to assist in the implementation of climate change goals and requirements," he said.

For more information, go to ***https://www.hnc.usace.army.mil****.*

HOLLY DECARLO-WHITE provides contract support to the U.S. Army Acquisition Support Center at Fort Belvoir, Virginia, as a writer and editor for Army AL&T magazine for SAIC. Previously, she was a public affairs specialist at U.S. Army Garrison Stuttgart, Germany. She holds a B.S. in merchandising management from the Fashion Institute of Technology, State University of New York and has more than a decade of communications and operations experience in the private sector.

AN ECO-FRIENDLY HOME

The new Lower Stilwell housing development at the Presidio of Monterey, California, features ENERGY STAR appliances, LED lighting and water-efficient fixtures. Army offices and installations are working to meet the goals of the Army Climate Strategy, and federal agencies are required to procure ENERGY STAR-qualified and Federal Energy Management Program-designated energy- and water-efficient products. (Photo by Winifred Brown, U.S. Army Garrison Presidio of Monterey)

ENERGY BOOST

Upgrades to energy-efficient technology help build a cleaner, healthier environment.

by Holly DeCarlo-White

Almost every American household recognizes the ENERGY STAR label. It is featured prominently on the majority of new electronic items sold today, from lightbulbs to major appliances. ENERGY STAR has grown to become the national standard for energy efficiency and, according to the U.S. Environmental Protection Agency (EPA), one of the most successful voluntary U.S. government programs in history, with a 90% recognition rate among American families. The EPA launched the ENERGY STAR program in 1992, creating a market for energy efficient products, homes and buildings. The program has led to an increase in the production and adoption of energy-efficient technologies and practices by American consumers and businesses, giving them options that use less energy to get the same job done.

Since the program's inception more than 30 years ago, the EPA reports that American families and businesses have saved more than $500 billion in energy costs and 5 trillion kilowatt-hours in electricity and have prevented 4 billion metric tons of greenhouse gas emissions from entering the atmosphere.

STAR STANDARDS

Both the Department of Energy (DOE) and the EPA promote energy efficiency, and they work together to avoid redundancies and prevent any extra burden for the manufacturers of energy-efficient products. The DOE establishes minimum energy-efficiency standards for products, which are taken into consideration when developing the robust specifications for ENERGY STAR product certification.

Before associating the label with any product model, manufacturers must submit performance data from an EPA-recognized laboratory to an independent certification body for review, to ensure the product meets ENERGY STAR standards tailored for the category it's in.

Product performance specifications are regularly updated, which any new ENERGY STAR product is expected to meet before earning certification. Across more than 75 different categories, products that earn the ENERGY STAR label meet strict EPA standards for energy efficiency with consideration to technology improvements, market trends and input from manufacturers and a range of stakeholders.

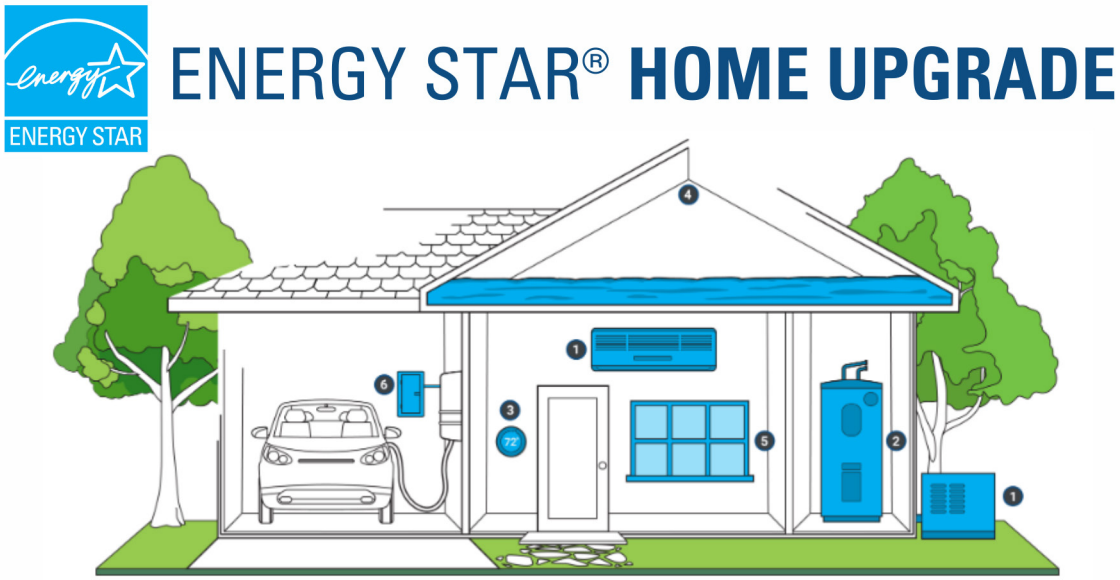
"Our program relies on comprehensive data reporting on product performance, market trends and stakeholder feedback to develop and revise standards for energy efficiency," said Leslie Jones, media and public affairs specialist for the EPA's ENERGY STAR Program. "Choosing products that have earned the ENERGY STAR certification is an easy way for consumers to reduce their energy consumption without having to make a daily conscious effort to adopt different habits."

Performance levels for products that earn the ENERGY STAR label are established by the EPA after reviewing efficiency performance across the range of models in a product category. Label recognition saves consumers the effort of having to look at individual efficiency ratings. By purchasing products with the little blue label (denoting top performers), customers can feel good about saving energy and money while protecting the environment. The program maintains an online search tool, ENERGY STAR Product Finder, to identify products that have been certified.

CLEARING THE AIR

Under the Clean Air Act, Congress directed the EPA to demonstrate nonregulatory strategies to prevent air pollution, including energy efficiency and switching to cleaner fuel sources. The ENERGY STAR program has been vital to supporting this strategy by designating product options requiring less energy.

"When energy consumption is reduced, fewer fossil fuels are burned to accomplish the same tasks, resulting in fewer greenhouse gas emissions and other air pollutants being released into the atmosphere," Jones said.



The preceding image contains the six areas of a home where efficiency improvements can be made: 1. Clean Heating and Cooling, 2. Super-Efficient Water Heater, 3. Smart Thermostat, 4. Well-Insulated and Sealed Attic, 5. High Performing Windows and Storm Doors, 6. Electric Ready

LOOK FOR THE STAR

The U.S. Environmental Protection Agency expanded the program launching the ENERGY STAR Home Upgrade in 2022 to connect American households at all income levels with resources to plan for a clean energy future through a series of high-impact, efficient electric improvements that can save the average family about $500 per year on utility bills. (Image courtesy of the Environmental Protection Agency)

ENERGY ENHANCEMENTS
One of two 800-amp breaker boxes installed to power the new electric vehicle charging stations at Fort Knox, Kentucky. To support its plan to field an all-electric fleet of nontactical vehicles, the Army is investing in electric vehicle charging infrastructure. (Photo by Jenn DeHaan, Fort Knox News)

In 2020 alone, the program's emissions reductions were equivalent to more than 5% of total U.S. greenhouse gas emissions. ENERGY STAR's 2020 energy savings also led to significant air pollutant reductions, responsible for an estimated $7 billion to $17 billion in public health benefits.

According to the World Health Organization, air pollution is one of the greatest environmental risks to health, and reducing air pollution levels reduces the burden of disease from stroke, heart disease, lung cancer and respiratory diseases, including asthma.

Thanks to the Inflation Reduction Act of 2022, which provides nearly $400 billion to support clean energy and address climate change, there are a number of ENERGY STAR-certified products that qualify for federal income tax credits and other incentives making energy efficiency more accessible and affordable. For example, new federal income tax credits provide discounts of up to 30% of the project cost, up to $3,200, for products such as heat pumps, water heaters, windows and insulation.

In 2024, additional income-based incentives are expected through the Home Energy Rebates Program for participating states and tribes to encourage and better enable the population to make energy-efficient upgrades that will lower energy bills and consumption.

CONCLUSION

ENERGY STAR provides a comprehensive checklist of energy-saving measures that businesses and commercial building owners can implement to reduce their energy usage. Choosing ENERGY STAR certified products, upgrading to efficient light-emitting diode (LED) lighting and adjusting the buildings' heating and cooling operations are some examples of key areas to focus on.

Army installations and facilities have all transitioned to LED lighting to meet higher energy standards. Additionally, offices like the Assistant Secretary of the Army for Installations, Energy and Environment and the Army's Office of the Deputy Chief of Staff for Installations (G-9), are working to meet the goals of the Army Climate Strategy, considering future installation planning, guidance and adaptation. For example, in line with the strategy's goal of fielding an all-electric, nontactical vehicle fleet by 2035, the Army is building and installing electric vehicle charging stations at more than 70 different sites. Federal agencies are required to procure ENERGY STAR-qualified and Federal Energy Management Program-designated energy- and water-efficient products as standard procedures for energy consumption cost savings.

The ENERGY STAR program defines a set of six high-impact energy-efficiency improvements individual homeowners can make, too. This includes upgrading a home's heat pump and water heater, installing a smart thermostat and ensuring well-sealed and insulated windows and attic spaces. Implementing upgrades to energy-efficient technology in the home or business helps transition from fossil fuels to not only save on cost, but also build a cleaner, healthier environment for all.

For more information, go to ***https://www.energystar.gov****.*

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TWO FIGHTS, ONE TECH

Soldiers depend on technology that will provide them with strategic advantages needed to protect our nation and defeat enemies. With the help of ASA(ALT)-led programs, Soldiers can meet these challenges head-on, while also using the latest in clean tech. (Photo by Warrant Officer Patrik Orcutt, U.S. Army National Guard)

THE GREEN EDGE

SBIR|STTR and xTech programs support the Army Climate Strategy by pinpointing ways to mitigate the impacts of climate change while maintaining Soldier readiness.

by Anna Volkwine and Daniel Smoot

With the increasing global threat of climate change—ranging from water scarcity, poor air quality and the spread of disease—the Army aims to do more than simply adapt to these progressing conditions. The Army is pinpointing ways to mitigate the impacts of climate change, while maintaining Soldier readiness and furthering strategic advancements across the defense landscape.

The Army's weapons of choice to combat climate change are the Army Small Business Innovation Research and Small Business Technology Transfer (SBIR|STTR) and xTech programs. Via the Army SBIR|STTR program, the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT)) offers small and nontraditional businesses opportunities to develop climate and clean technologies that show technical merit, feasibility and commercial potential. Through the xTech program, firms can earn nondilutive cash prizes and a chance to engage with Army subject matter experts. ASA(ALT) combines the strengths of these programs to identify and acquire innovative technologies from nontraditional sources—accelerating the acquisition process and driving "green" objectives to the forefront of the Army's 2022 Climate Strategy.

ASA(ALT) is collaborating with nontraditional innovators to decrease the Army's carbon footprint and cultivate a climate-resilient force. Similarly, the congressionally funded ASA(ALT)-sponsored Army SBIR|STTR and xTech programs are competitive, contract- and cash-prize-based initiatives that enable Soldiers and Army experts to provide a pathway for innovators to develop climate and clean tech solutions for the Army.

SOLUTIONS THAT WIN
Matt Willis, Ph.D., director of Army Prize Competitions and the Army Applied SBIR Program, left, congratulates Alexis Carpenter, chief innovation officer, and Doug Speigth, CEO, of AxNano, a climate and clean tech winner from the xTechPrime competition, for their mobile supercritical water oxidation solution. (Photo courtesy of the U.S. Army xTech Program)

CLEAN TECH INITIATIVES

With enterprise-wide efforts to minimize environmental impacts, the Army SBIR|STTR program collaborates with small businesses and Army stakeholders to develop climate and clean technology solutions, including clean energy generation, clean industry technology, clean micro-grid solutions, electric transportation and energy storage. These solutions fall within the Army SBIR program's climate and clean tech portfolio, which prioritizes maximizing equipment efficiency while minimizing emissions across operations.

Through the Army's Climate Strategy, the Army seeks to reduce its net greenhouse gas emissions by 50% within the next 10 years. The Army also aims to achieve net-zero greenhouse gas emissions by 2050 by exploring and implementing renewable energy sources and equipment in combat environments. These goals drove the climate and clean tech portfolio's $76.65 million investment in calendar year 2023, which remained focused on improving the Army's capabilities, reducing its traditional fuel demand, and cutting greenhouse gas emissions by bringing new technologies—such as the electric vehicle battery total life cycle system for improved electric vehicle battery management, carbon-free Soldier power generator and the sustainable building materials open topic—to Army programs and systems.

"The Army SBIR program's climate and clean tech portfolio executes its mission of reducing greenhouse gas emissions by buying down risk for larger Army R&D [research and development] and acquisition programs," said Blaise Zandoli, the Army Applied SBIR program's portfolio manager for climate and clean tech, and artificial intelligence and machine learning. "This encourages the best and brightest firms within the American small business community to propose their clean technologies for SBIR funding, while enabling Army organizations to benefit from critical, next-generation energy solutions."

INVESTMENTS IN ACTION

As a part of the Army SBIR|STTR program's climate and clean technology investments, the program coordinates with Army customers who are addressing the impacts of climate change.

GREEN ANNOUNCEMENT
Honorable Douglas Bush, assistant secretary of the Army for acquisition, logistics and technology, provides opening remarks at the U.S Army xTechPrime finals event in December 2023, where the Army announced three small businesses as the winners under the climate and clean tech topic area. (Photo courtesy of the U.S. Army xTech Program)

These programmatic efforts have helped clean technology use cases flourish across the Army landscape. In addition to the mechanisms offered by the ASA(ALT) Office of Army Prize Competitions and Army Applied SBIR Program, Army organizations are addressing challenges beyond enhancing their capabilities, such as tackling Soldier water shortages in remote locations and reducing hazardous emissions produced by large vehicles.

Inspired by the Army's Climate Strategy, Army transition partners have continuously sought ways to maintain strategic advantages while deliberately reducing their carbon footprint. These requirements helped influence the U.S. Army Combat Capabilities Development Command Ground Vehicle Systems Center's (DEVCOM GVSC) small business solicitations for conformable hydrogen storage and hydrogen generators.

"It's important to note that all our efforts, including those like the conformable hydrogen storage and hydrogen generator solicitations, remain focused on making our warfighters and formations more capable and lethal first," said Benjamin Paczkowski, a chemical engineer with DEVCOM GVSC. "However, these technologies help address the Army Climate Strategy by enabling the development of zero emissions powertrains—specifically hydrogen fuel cells."

Through the SBIR contracts awarded under the conformable hydrogen storage solicitation, the Army seeks to develop and mature the next generation of hydrogen storage technology—allowing for increased clean energy storage on electric vehicle platforms. In that same vein, the hydrogen generator solicitation aims to create a contingency system to assist these electric vehicles should they run out of fuel.

As these contracts have progressed, DEVCOM GVSC's fuel cell team has assisted the Program Executive Office for Combat Support and Combat Service Support Product Manager for Ground Mobility Vehicles with their ongoing research and evaluation of fuel cell-based mobile vehicle chargers for locations without infrastructure.

"Conformable hydrogen storage will allow for future vehicles to have a similar range and capability as current platforms," Paczkowski said. "The hydrogen generator system will create energy on-demand from a chemical reaction—providing confidence by dramatically increasing operational duration."

XTECH'S GREEN EDGE

ASA(ALT)'s framework for long-term climate mitigation spans across efforts from the xTech program—which optimizes the solicitation of clean technologies via a prize competition model. The program launched in 2018 and has since run over 30 competitions to request dual-use technology solutions from nontraditional innovators under an umbrella of challenge areas that impact the Army. One of these challenge areas includes clean tech—a technology ecosystem that has grown into a signature topic for xTech over the past couple of years.

XTech launched its first clean tech-specific prize competition, xTechSBIR Clean Tech, in April 2022 following the release of the Army Climate Strategy. The program launch received nearly 200 submissions for Soldier-operative solutions that could also offer climate change mitigation. Only three months after the competition's launch, xTech announced 24 winners, who each received $10,000 in cash prizes and the chance to submit for an Army SBIR Phase I contract award valued up to $250,000 or a Direct to Phase II contract award worth up to $1.9 million.

"The Army has an operational footprint and leaves a carbon trail—this is indisputable," said Matt Willis, Ph.D., director of Army Prize Competitions and the Army Applied SBIR Program. "As a result, it's a priority that the Army invests in technologies that recognize this as a reality and reduce greenhouse gas emissions for now and in the future."

XTechSBIR Clean Tech small businesses have continued to build off the momentum of SBIR contract awards earned by first-place winners. For example, e-volv, a small business based out of Littleton, Colorado, received and completed a Phase I SBIR contract award as a winner of the competition for its utility-grade commercial superconductor cable and magnet-based products. Now, the company has an Army SBIR Phase II contract focused on developing and demonstrating its innovation from Phase I into an optimized power cable for Army aircraft needs.

According to Glenn Auld Knierim, Ph.D., e-volv's chief technology and executive officer, their technology can help remove global dependence on fossil fuel use, with their cables transforming power delivery in Army and commercial microgrids around the world and supplying clean energy for many customers and missions.

"Coincident with climate-friendly electricity-based technologies are innovations that enable offensive and defensive capabilities unrivaled in power, density and performance," Knierim said. "As scientists, we see a path leading toward clean energy."

The program's dedication to engaging with scientists and innovators who see real potential in clean technology—such as e-volv—has persisted since the conclusion of xTechSBIR Clean Tech. More recent xTech competitions continue to amalgamate clean tech solutions with countless possibilities for Army application. For example, in April 2023, xTechPrime launched support to Army modernization priorities, including climate and clean tech. The competition put a unique spin on the standard xTech competition model. Small businesses brought their solutions and partnered with technology integrators, who brought their expertise in early-stage business development, prototyping, marketing and Army relations. Out of nearly 350 proposals, 77 small businesses submitted to xTechPrime under

BLUE SKY PLAN

To keep our planet green and skies blue, ASA(ALT)-led programs are partnering with nontraditional innovators to equip Soldiers with technologies that mitigate the Army's carbon footprint. (Photo by Spc. Orion Magnuson, 2nd Cavalry Regiment)

the climate and clean tech topic area. While this is only a sample of clean tech solutions that could be available to the Army, this number demonstrates how technology on a broad scale now prioritizes climate change mitigation.

"Almost 25% of xTechPrime submissions fell under the climate and clean tech category," Willis said. "This data point reflects how high priority clean tech is for both industry and the Army. The xTechPrime competition, among other ASA(ALT)-led efforts, help create synergies between the two to negate the Army's contributions to climate change."

The competition announced 24 small businesses as finalists in November 2023, with seven offering climate and clean tech solutions. The finalists advanced to the xTechPrime finals event in mid-December, where the program announced three climate and clean tech winners: ATOMICS Inc., AxNano and GDI.

With xTech wins under their belts—which included $40,000 in cash prizes, the opportunity to submit for a Direct to Phase II Army SBIR contract worth up to $1.9 million and partnerships with prime defense contractors—these climate and clean tech winners have made critical gains toward success.

LOOKING AHEAD

ASA(ALT) programs lead the way in finding and using clean technologies for the Army, ensuring Soldiers have a strategic edge. Army subject matter experts who serve as evaluators for both Army SBIR and xTech are consistently impressed by the technology advancements made by nontraditional innovators working to combat climate change.

Peter Reynolds, Ph.D., a senior research scientist at the Army Research Office, a directorate of DEVCOM Army Research Laboratory, is a frequent xTech and Army SBIR evaluator. Reynolds noted that many of the solutions were impressive in terms of taking on riskier, yet potentially game-changing, approaches. He cited one proposal, which addresses improved efficiency of solar cells that could reduce logistical burdens on deployed troops for their energy needs, while also having impacts on society-at-large to decrease reliance on fossil fuels. While not every Army SBIR or xTech proposal promises to be game-changing, Reynolds sees possibilities in the near future of clean tech for Army application.

"It is refreshing to see that many of the xTech proposals I'm seeing are building off of basic research that the Army has been investing in for 10, 20 and even more years, and to see that this research is now bearing fruit," Reynolds said.

Paczkowski also serves as an evaluator for Army SBIR and xTech proposals, using his expertise to score the top proposals in industry. Throughout his proposal evaluations for both programs, Paczkowski noted that he is constantly impressed by the breadth and range of solutions provided by the small business community—within the clean tech space and beyond. For the future of clean tech, Paczkowski is looking forward to seeing developments in one key area. "As technologies and requirements continue to develop, I would expect to see significantly more headway in the electrification space across all of the Army's systems, from Soldier power to ground vehicles, to aircraft and everything in between," Paczkowski said.

CONCLUSION

While solutions to mitigate climate change have the future of the planet in mind, this does not mean that climate change is a future problem—it is a current challenge that requires action. ASA(ALT) remains committed to leading the Army through a technological evolution by tapping into the ingenuity of nontraditional innovators.

"Army SBIR and xTech view clean tech as not a stamp in time, but as an evolvement and continued effort to evaluate new technologies from the best in industry," Willis said. "The programs have a unique opportunity to support the Army Climate Strategy through untapped resources, while also contributing to a safer and cleaner world at large."

For more information on the Army SBIR|STTR Program, go to ***www.armysbir.army.mil****. For more information on the xTech Program, go to* ***www.xtech.army.mil****.*

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NEW AND IMPROVED
Team members remove a recently delivered T901 engine from its shipping crate in West Palm Beach, Florida. (Photo by David Hylton, PEO Aviation)

CLEANER AIR ON THE HORIZON

The Improved Turbine Engine supports the Army Climate Strategy.

by Gina Bublitz and Caroline Lumb

The Army's Improved Turbine Engine (ITE) supports the Army Climate Strategy by increasing operational capability while reducing greenhouse gas emissions. The strategy is the Army's framework for mitigating the force's effects on climate change. The ITE will provide Army aviation the power to operate in multidomain operations, with longer ranges for improved reach and heavier payloads to mass combat power quicker, while improving lethality and supporting the Army Climate Strategy objective of reducing the force's overall greenhouse gas emissions.

The ITE, also known as the T901-GE-900 (T901), is the Army's new 3,000 shaft horsepower engine designed to fit within the current engine footprint of the AH-64 Apache and the UH-60 Black Hawk helicopters. The T901 will replace both aircrafts' current GE T700 engines.

INCREASED MULTIDOMAIN REACH AND LETHALITY

The T901 holistically combines additive manufacturing and traditionally machined parts to produce an engine that, despite using less fuel, is 50% more powerful than its predecessor, the T700. The T901 more than doubles the Apache and Black Hawk platforms' mission payload while operating at 6,000 feet/95-degrees Fahrenheit, dramatically improving the ground commander's reach and lethality across the battlefield. The AH-64

Apache and UH-60 Black Hawk will be able to meet mission objectives faster, with fewer aircraft, and spend more time on station with less fuel. This reduces dependence on forward arming and refueling points—temporary areas established close to combat zones used to provide fuel and ammunition necessary for aviation units to remain close to the fight—and their requisite logistics and security requirements. The cumulative benefits of the reduced fuel consumption and enhanced performance range of the T901 will allow a company air assault to be executed in a single lift (which eliminates refueling and multiple flights), thereby completing the mission in half the time while using less fuel compared with the T700.

REDUCED LOGISTICAL BURDEN

The Army's T901 engine further supports the Army Climate Strategy by utilizing advanced technology to reduce sustainment demand. The advanced engine employs predictive logistics, which offers future interoperability with Prognostic and Predictive Maintenance (PPMx), a set of linked components that provide self-diagnosis and automated maintenance alerts. T901 technological capabilities minimize acquisition and logistics footprints by using advanced diagnostics, system prognostics and health management to implement Condition-Based Maintenance Plus (maintenance performed based on evidence of need) and Item Unique Identifier (unique identifier that applies to a single item) marking requirements and initiatives. The ability to share usage, health and maintenance data across the network with the aviation enterprise is a crucial step in fleet management that is made possible by employing PPMx.

The Engine Health Monitoring System on each engine provides an accurate assessment of the engine's gas path health and rotor life consumed. The indicated condition prompts maintenance efforts rather than relying on gross indicators such as operating hours, cycles or calendar time. The need-based maintenance model reduces maintenance and sustainment demand and creates less waste than

ABOVE AND BEYOND

The T901 engine, designed to fit within the current engine footprint of the AH-64 Apache, combines additive manufacturing and traditionally machined parts to produce an engine that is 50% more powerful than the T700—dramatically improving the ground commander's reach and lethality across the battlefield. (Photo courtesy of U.S. Army Yuma Proving Ground)

The ability to share usage, health and maintenance data across the network with the aviation enterprise is a crucial step in fleet management.

BLUE SKIES AHEAD
The ITE program will help reduce greenhouse gas emissions—the T901 saves 45,000 pounds of greenhouse gas emissions annually per aircraft. (Photo by Oleksandr P, Pexels)

performing maintenance based on gross indicators. Metrics from necessary maintenance also contribute to and improve reliability, availability and maintainability data. Logistics product data will become more accurate as well because there will be a better understanding of spares needed, how often they are needed, and what costs there will be due to those needs.

Additionally, the T901 utilizes advanced coatings for erosion resistance and thermal barriers. It incorporates key technologies such as ceramic matrix composites to increase engine durability and reduce engine weight. By extending time between overhauls, the T901 can reduce maintenance costs by up to 35%. Utilizing advanced technologies is just one of many ways the Army is modernizing to further advance the Army Climate Strategy mission of supporting the nation's climate change goals and addressing national security threats.

GREENHOUSE GAS EMISSIONS REDUCTION

Besides significant operational and sustainment benefits, the ITE program supports the Army Climate Strategy by reducing greenhouse gas emissions. Greenhouse gases consist of harmful manmade and natural emissions that trap heat in the atmosphere. According to the strategy, climate change is a direct threat to U.S. security and the Army must work proactively to reduce associated risks. Each aircraft equipped with the T901 saves 45,000 pounds of greenhouse gas emissions annually. In total, Army aviation will reduce greenhouse gas emissions by 133.6 million pounds annually once all Apache and Black Hawk aircrafts are equipped with the T901. ITE supports the Army Climate Strategy mission through "more effective power solutions" and "advancements in manufacturing" to increase combat effectiveness and reduce greenhouse gas emissions.

CONCLUSION

The Army will reduce the force's overall contributions to climate change by implementing the Army Climate Strategy's lines of effort. The T901 engine is a modernized combat multiplier that will increase Army aviation capabilities by boosting multidomain reach and lethality. It will better support the warfighter by providing increased reliability and sustainability for the AH-64 Apache and the UH-60 Black Hawk. The T901 engine accomplishes this while also supporting the Army Climate Strategy's objective of reducing greenhouse gas emissions.

For more information, go to ***https://www.army.mil/PEOAviation****.*

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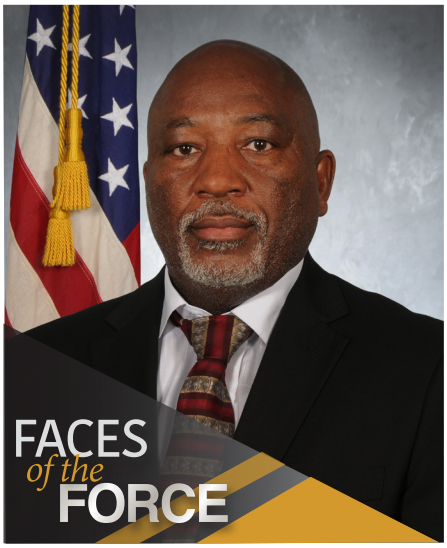

TOMMY L. WILLIAMS

COMMAND/ORGANIZATION: Program Executive Office for Simulation, Training and Instrumentation

TITLE: Lead logistician

YEARS OF SERVICE IN WORKFORCE: 45

YEARS OF MILITARY SERVICE: 25

DAWIA CERTIFICATIONS: Advanced in life cycle logistics

EDUCATION: MBA in acquisition and contract management, American Graduate University; M.A. in counseling and human resources, University of Oklahoma; B.A. in criminology, Saint Leo University; A.A. in general studies, Georgia Military College

AWARDS: Legion of Merit; Meritorious Service Medal; Army Commendation Medal (4); Army Achievement Medal (5); Meritorious Civilian Service Medal; Civilian Service Commendation Medal; Civilian Service Achievement Medal

IT TAKES A TEAM

Tommy Williams has served the Army as both a Soldier and civilian, so he knows that working independently is important, but teamwork is most beneficial when you need to accomplish a task. "It takes the entire team for a successful program to be developed and provide the warfighters with a capability that will enhance their Soldier skills," he said. "This is important work we do and must be taken seriously as taxpayers expect us to use funds properly and provide the warfighter with the tools and resources needed in order to take the battle to our foes."

Williams, who began his career with the Army in 1985 as an active-duty Soldier and logistics officer, is currently the lead logistician for the Virtual Training Systems Portfolio—the basic electronic maintenance trainer and family of maintenance trainers for Armored Multi-Purpose Vehicles (designed as part task trainer and diagnostic task trainer)—at the Program Executive Office for Simulation, Training and Instrumentation (PEO STRI). According to Williams, these simulations are located at various Army installations (active, Reserve and National Guard facilities) whereby the Soldier can train and troubleshoot defaults without having to use a live vehicle.

"In my job we develop simulators for warfighters to train on in a simulated environment, from weapons to vehicles and aircrafts," he said. "Simulation reduces accidents and it's the most cost-effective way to achieve the best end result."

Being active-duty in logistics, he said, there is some involvement in acquisition, but he became more involved after he retired from the military and joined the civilian workforce. "I came to PEO STRI from Saudi Arabia via Priority Placement Program. This was my first coded acquisition position and an eye opener," Williams said. Coded meaning an employee should be certified through training, education and experience standards, based on the duties of the position. "There is so much to learn and put into action that always benefits the warfighter and Department of the Army."

The Priority Placement Program provides career placement assistance to eligible DOD employees who have been adversely affected by events at their work location through no fault of their own. What appealed to Williams the most about Army acquisition was what went on behind the scenes in fielding equipment that everyday Soldiers and civilians do not typically get to see.

"One of the most important points in my career is that you are at the 'tip of the spear,' " he said. "Meaning that we are involved in the survivability of the warfighter and increasing Soldier readiness. Soldiers' skills and training is what helps to win wars, and being in acquisition as a logistician I play a critical role in successful training of the warfighter."

Although being assigned to an acquisition position earlier in his career would have been of great benefit, Williams said he's had the opportunity to take advantage of many valuable programs, courses and training to make up for that.

He enrolled in the Air Force War College in 2008 and completed the program in 2009. "My focus was first to see how I could improve my strategic thinking utilizing the assets that this course could provide," he said. "There is so much to grasp and understand thinking outside of the box. It places you in scenarios that will require critical thinking to gain the confidence as a strategic leader from subordinates and allies, as well as being able to place into practice learned skills." Williams said having an Army background and being selected for the Air Force War College was a challenge in itself. "My expectations were that this will broaden my understanding and thought process on how the DOD 'fights to win' strategically. This fight is not for one particular service alone, but jointly and may include foreign countries."

Williams said the course requires dedication and a willingness to step outside of your comfort zone in order to gain and appreciate the learning that is available. "There is so much to absorb and put into everyday practice," he said. "In everyday life and decision-making, I try to look at what I want the outcome to be and make sure the proper resources are available."

He believes that because of the Air Force War College, he has been placed in positions of greater responsibility. "I have been assigned overseas in various positions to fully appreciate the knowledge gained through this course that can and is being used consistently. I would recommend that this course be a requirement for all those that are in senior leadership positions and assigned to multiple programs that assist the warfighters in their capabilities," he said. "This is how programs are not only tied to each other, but across other services in DOD."

The most recent development program Williams attended was the Product Support Manager Course in 2019. "It brings you up more on the strategic level and provides a broader view of not individual programs, but the PEO as a whole, and the support a logistician can provide," he said. "I would recommend this course to all logisticians that are looking to enhance their knowledge base and support programs versus products."

With a broadened range of experience and training under his belt, Williams offers advice to junior acquisition personnel. "Don't be afraid if you do not understand something from the beginning, this career field covers a large scale, but absorb all you can and try to practice as much as possible. If you want to learn how to swim, get out of the boat."

Outside of work, Williams has a small farm that includes chickens and vegetables. "This keeps me busy and helps me develop strategies to keep it going," he said. "The commonality with work is that you must think strategically, logically and constantly. Know that the adversary is always watching. In the case of my farm, my adversaries are the foxes, bobcats, hawks and racoons that are trying to either steal, kill or eat the chickens. Remember, the lion is out there, and you must not be fearful of it."

—CHERYL MARINO

GET OUT OF YOUR COMFORT ZONE
Williams demonstrating how combat equipment (sold to Saudi Arabia) could increase security in Singapore, on May 12, 2018. He always recommends getting out of your comfort zone and interacting internationally, globally and strategically. (Photo courtesy of Tommy Williams)

THE SOFTWARE ADVANTAGE

How the Army is embracing modern software development and acquisition practices to maintain a competitive edge.

by Margaret Boatner

More than ever before, the ability to rapidly develop and deploy software is a national security imperative. In the past, software typically served as an enabler of hardware systems and weapons platforms. Today, however, software underpins our mission-critical capabilities. It drives our weapons, business and training systems and is embedded into the processes that make DOD function. In the past 10 years, the number of our systems reliant on software has increased nearly 30%. While technology and software capabilities have advanced significantly in recent years, the Army's processes by which software is developed and acquired have not similarly matured. As the Army moves into this software-intensive world, it's critical that its institutional policies and processes evolve to support agile and iterative development of software. With the release of Army Directive 2024-02, "Enabling Modern Software Development & Acquisition Practices," the Army has taken a major step in this evolution.

THE SOFTWARE CHALLENGE

Software is a key component of nearly everything the Army operates and uses. This includes weapon systems across all capability portfolios, from missiles and air defense like the Army's Integrated Air and Missile Defense program, to ground combat vehicles like the Robotic Combat Vehicle. Our business systems—or information systems—are similarly driven by software. For example, the Army uses the Global Combat Support System to manage its logistics operations and the Army Contract Writing System to write and manage contracts across the Army. The same reliance on software extends to the "back of house" processes that the Army depends on to operate, such as the Defense Travel System, which is used to plan and schedule travel.

MODERN METHODOLOGIES

Software is a driving force of military weapons and training systems embedded into the processes that make DOD function. (Image by the Program Executive Office for Intelligence, Electronic Warfare and Sensors)

Our adversaries are similarly reliant on software-driven capabilities. In recent years, the Chinese government and defense industry have been pursuing significant investments in robotics, swarming, autonomous operations, artificial intelligence, machine learning and other novel capabilities. It's clear from these investments that China—the United States' pacing threat—is seeking to use software-driven technologies to enhance its national security and military capabilities. China, and others, will use such technologies to target our military facilities, weapons systems and assets, Soldiers, networks and critical infrastructure.

The challenge facing the Army now is clear: The hardware advantage that American systems have long enjoyed is becoming less determinative of a military advantage; software is leveling the playing field. The competitor that can rapidly develop and iteratively upgrade its software-defined capabilities will have an advantage in future conflicts. To achieve this advantage, the Army must pivot away from historical, waterfall software development approaches and adopt the modern software development practices that will allow us to rapidly respond to emerging technologies and threats in an ever-changing global landscape.

MODERN METHODOLOGIES VS. INSTITUTIONAL ARMY PROCESSES

Modern software development methodologies promise enhanced capabilities by prioritizing rapid delivery of solutions, adaptability and collaboration with users, ensuring that software products are not

WHAT IS MODERN SOFTWARE DEVELOPMENT?

Modern software development is an iterative approach to managing software development projects that focuses on continuous releases and customer feedback. Modern methodologies include continuous integration/continuous delivery, agile, lean and DevSecOps (development, security and operations) practices. The underlying principles of modern software development can be explained by three key pillars:

- **Iterative development:** A cyclic approach to development, where stages of the development cycle (requirements, design, development, implementation, testing and deployment) are frequently revisited to refine and improve the software.
- **User-centered design:** Developers and users work in collaboration throughout the development cycle to inject user feedback in real time and ensure the software consistently addresses the evolving needs of the user.
- **Continuous improvement:** Given the iterative nature of the development, the software is continuously refined and improved, resulting in enhanced capabilities. In an agile environment, software is never done.

CASE FOR CHANGE

- Army Directive 2024-02 represents the first effort across DOD to comprehensively adjust institutional processes in line with private sector best practices related to software development and acquisition.
- The policy includes 12 reform initiatives, targeting the full range of institutional processes, including requirements, acquisition, contracting, test and evaluation, cybersecurity, cost estimation, sustainment and data governance.
- The policy will not only address software development conducted by the program executive offices, but also the software development executed outside of the formal acquisition process by Army commands and other organizations.
- Several of the initiatives are specifically focused on developing the talent and expertise needed to execute modern software development and avoid common pitfalls.

only functional but also aligned with capability gaps and user needs. (See sidebar, "What is Modern Software Development?") These approaches are broadly adopted by the private sector and have been widely recognized as best practices in the field of software development since the early 2000s.

In contrast to the private sector, software development in the Army has traditionally used the waterfall approach, which is linear and sequential, requiring that each phase—from requirements development to deployment—be completed before the next can begin. This often means that changes are costly, time-intensive and hard to implement once development starts. The Army's use of the waterfall approach is, in part, driven by the Army's underlying, institutional processes, which were put in place in the Cold War era and were designed for the development of the hardware-based capabilities that were so critical at the time. As a result, software has historically been acquired, developed and managed much like hardware.

Let's look at an example of the process our software-intensive systems are subject to under this waterfall approach. At the earliest phase, requirements must be documented and approved. Currently, requirements are written in a very detailed and prescriptive manner (often totaling hundreds of pages in length), can take a significant period of time to be approved and are not frequently reassessed based on user feedback. This can result in inflexible requirements that cannot easily be changed to respond to user needs. Next, these systems enter the acquisition process. Until the creation of the Software Acquisition Pathway in October 2020, software-intensive programs were forced to comply with an acquisition process designed for hardware systems, which did not support the flexibility and

adaptability required by modern software development. As programs progress through development, numerous test and evaluation activities occur at rigid points in the process and are completed in a sequential manner. And often, tests that are done by a vendor or other entity are repeated, adding more time and cost. Lastly, once development concludes and systems are deployed, they historically transition to sustainment, where they are maintained, with only minor updates, until they are disposed of. This is counter to the premise that "software is never done" and limits the ability of our software-intensive systems to be continually refined and improved to meet emerging needs.

This approach results in software development that takes years to complete, with big-bang capability releases often separated by years, and software solutions that do not always account for changing user needs and threats. Given the evolution of technology in the last several decades and the increasingly software-defined environment we are operating in, this process no longer meets the timely demands of our warfighters. Importantly, adoption of modern software practices is not a technical challenge—recall that the private sector has been doing this for decades. Rather, the Army's challenge is adjusting its longstanding processes to accommodate these methodologies.

POLICY AND REFORM INITIATIVES

Recognizing the need to reform, the Army launched a comprehensive review of its institutional processes to determine where changes are needed to promote modern software development and acquisition. As a result, the Army released Army Directive 2024-02, "Enabling Modern Software Development & Acquisition Practices," on March 9, 2024. This new policy

PANEL DISCUSSION

Boatner, second from left, joined a panel of experts to speak about the continuous integration and continuous delivery model in Washington in October 2023. From left is Jennifer Swanson, deputy assistant secretary of the Army for data, engineering and software; Willie B. Nelson, deputy to the commanding general, United States Army Futures Command; James Amato, executive technical director and deputy to the commander, United States Army Test and Evaluation Command; and Megan Dake, deputy assistant secretary of the Army for procurement. (Photo by Alexander Baquilod, Office of the ASA(ALT))

CONTINUOUS INTEGRATION, DELIVERY

The author, center, addresses audience members during a digital engineering presentation at the Association of the United States Army Annual Meeting and Exposition in Washington on Oct. 11, 2023. (Photo by Alexander Baquilod, Office of the ASA(ALT))

represents one of the first significant efforts across the DOD to comprehensively adjust processes to align with private sector best practices. The policy is comprised of 12 reform initiatives, targeting processes across the entire development life cycle. The most significant new requirements of the policy are summarized below:

1. **Establish a flexible requirements process.** Under the new policy, requirements for software development programs and efforts must be written at a high level, prioritized and reassessed, and refined over time based on user feedback. This allows requirements to change based on evolving technologies and the changing threat landscape.
2. **Ensure continuous user-developer teaming.** Under the new policy, users are required to be continuously involved throughout the software development life cycle through user-developer teams. These teams will identify and prioritize requirements, determine tradeoffs of software features and assess user value. This ensures software solutions are iteratively developed in line with user needs.

While technology and software capabilities have advanced significantly in recent years, the Army's processes by which software is developed and acquired have not similarly matured.

3. **Tailor processes to enable agile development.** The policy requires acquisition and contracting approaches that allow for the rapid iteration of software solutions. This includes maximizing use of the Software Acquisition Pathway—the acquisition pathway designed for agile software development—alone or in conjunction with other pathways; employing contract strategies that increase flexibility and adaptability, including modular contracting or multiple award contracts; and using contract types such as cost reimbursement, labor hour, incentive and/or hybrid that allow for refinement of the requirements based on the evolution of the software solution and changing user needs.
4. **Establish a Contracting Center of Excellence for Digital Capabilities.** To ensure the Army's contracting strategies provide flexibility, incentivize modern development approaches and ensure vendor accountability, the policy designates the Army Contracting Command at Aberdeen Proving Ground, Maryland, as the Contracting Center of Excellence for Digital Capabilities. The center will be responsible for executing select contracts and for promulgating best practices across Army contracting organizations to ensure a consistent approach.
5. **Establish the Software Management and Response Team (SMART).** Successful execution of software development efforts requires personnel with expertise and experience in modern software development practices. To ensure this type of expertise is available at scale to support software development efforts underway across the Army, the SMART will be established within the Office of the Chief Information Officer. The team will provide distributed support to, and conduct peer reviews of, software development efforts executed outside of the program executive offices, including those executed by Army commands, Army service component commands and other Army organizations.
6. **Manage software development efforts not subject to formal acquisition oversight.** The new policy implements several new requirements to ensure the synchronization of software development efforts executed across the Army, including those executed by Army commands, Army service component commands and other Army organizations. This includes directing that requirements for these software efforts be reported to Army headquarters for review and prioritization, requiring these activities to be executed through select contracting organizations, and mandating enhanced reporting of the status and progress of these software efforts.
7. **Streamline software test requirements.** Proper test and evaluation of our software is important to ensure reliable and secure software. However, current processes often lead to duplicative testing and extended timelines. To address this, the new policy will reduce duplicative test requirements by employing test data reciprocity to the maximum extent possible. Moving forward, government testing will only be required when reliable data from other sources—such as the vendor—is not available. Additionally, test requirements will be tailored based on the significance of new capabilities and/or features.
8. **Modernize cybersecurity approaches.** The policy requires that current cybersecurity approaches be modernized. This includes complying with current DOD risk management framework to obtain an authority to operate (ATO), an approval required for

an information technology solution to operate on the government network. Processes required to comply with the framework will be automated to the maximum extent possible to decrease the time, workload and costs required by the current manual process. The Army will also establish ATO reciprocity across Army organizations to streamline requirements and accelerate capability deployment and will seek ATO reciprocity from the Office of the Secretary of Defense and the other services. Finally, the Army will initiate a transition from the traditional, static ATO to continuous ATO processes to enable real-time cybersecurity monitoring.

9. **Modernize approach to software cost estimating.** The Army will adopt industry best practices for developing software cost estimates that support modern software development approaches.
10. **End traditional software sustainment.** Recognizing that software is not developed, tested, procured, operated and sustained sequentially, the Army will transition from the traditional sustainment model to a continuous integration/continuous delivery model, wherein software is continuously and iteratively developed and upgraded throughout its life cycle.
11. **Enable data-centric interoperability.** Currently, the Army has a complicated data environment, in which data is often stovepiped across various communities and systems, limiting its ability to make data-informed decisions. The Army is updating the Army Data Plan and related policies to enable data interoperability in and between environments. The Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology will define a data reference architecture that will help to connect the various data systems and services, enabling data to be easily discovered, accessed and consumed by users. This will allow the Army to more effectively and efficiently handle and use its vast amounts of data.
12. **Enhance talent management.** None of the initiatives outlined above can be successful without the right talent. Under the new policy, the Army will be more deliberate in attracting, utilizing and training talent skilled in modern software development practices. Select organizations across the requirements, acquisition, contracting, sustainment, testing and cyber communities will develop plans to upskill their respective workforces on modern software development practices. The Army is also exploring innovative ways to attract and retain technical talent, including use of special pay scales, and will develop career progression maps to empower career development for the digital workforce that exists across career fields.

SOLUTIONS ACROSS SYSTEMS

Software is a key component in just about everything the Army uses, from laptops to building security to missiles, helicopters and tanks. (Image by the Program Executive Office for Intelligence, Electronic Warfare and Sensors)

CONCLUSION

Developing software faster, more efficiently and with greater impact will allow us to better respond to evolving technologies, challenges and threats, sharpening our competitive advantage and ensuring that we can deliver critical capabilities to Soldiers. Implementing the reforms contained within Army Directive 2024-02 will help the Army achieve this objective by fundamentally changing how it develops and acquires software.

For more information on the new policy and reform initiatives, go to ***https://armypubs.army.mil/ProductMaps/PubForm/Details.aspx?PUB_ID=1028554.***

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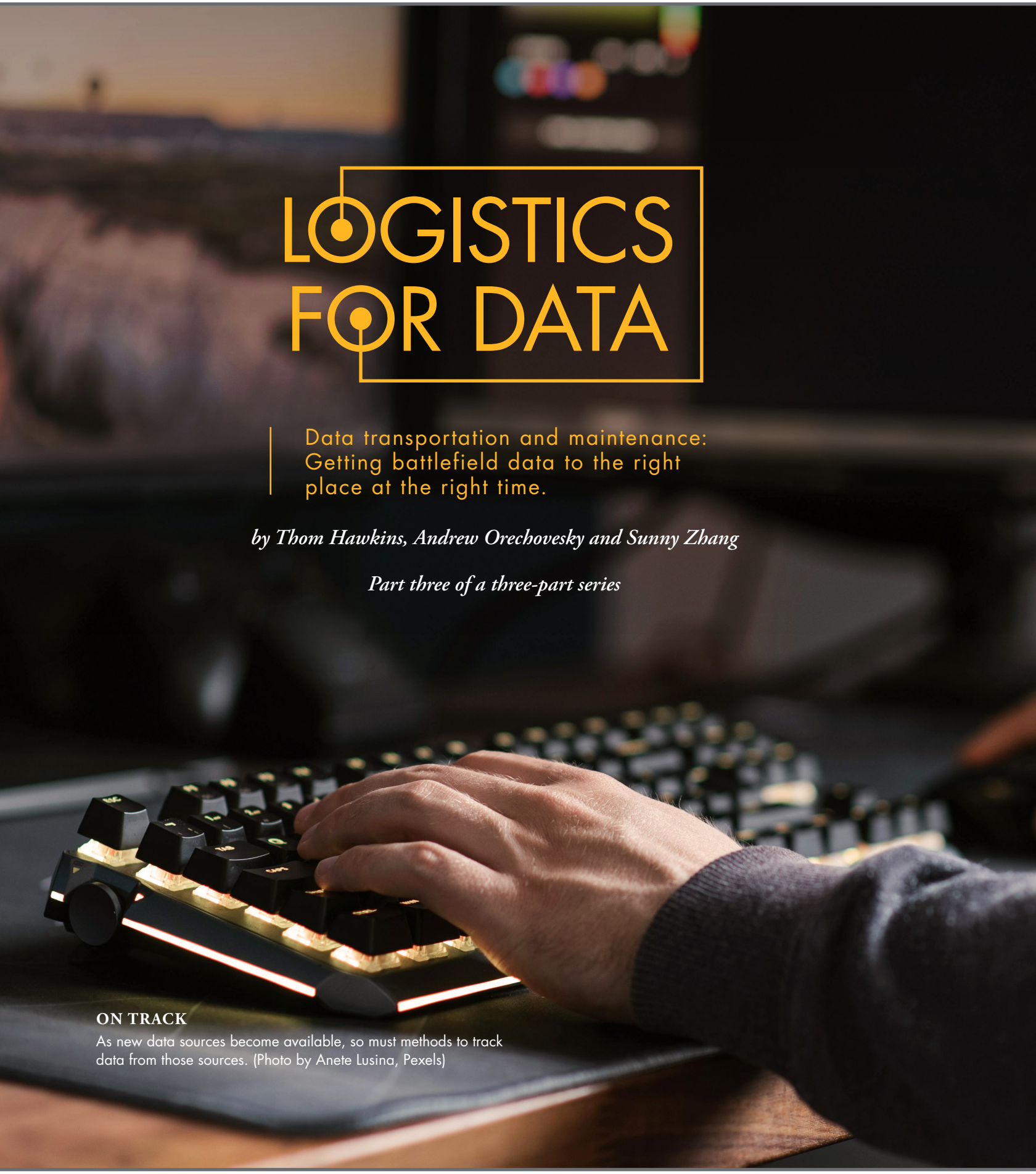
LOGISTICS FOR DATA

Data transportation and maintenance: Getting battlefield data to the right place at the right time.

by Thom Hawkins, Andrew Orechovesky and Sunny Zhang

Part three of a three-part series



ON TRACK
As new data sources become available, so must methods to track data from those sources. (Photo by Anete Lusina, Pexels)

Running out of toilet paper has a way of focusing your attention. In that way, the COVID-19 pandemic made many of us more familiar with logistics and the supply chain. We had to estimate the depletion rate of our supplies and the lead time to procure replacements. We discovered the convenience of delivery—not only books and household goods but also food, and even alcohol. The supply chain became so overwhelmed with demand that some of us were drafted into it, distributing misdelivered packages to our neighbors.

The first two entries in this series ("Logistics for Data," Army AL&T Fall 2023 and "Logistics for Data," Army AL&T Winter 2024) discussed the demand signal for data and the inventory and warehousing of data. This third and final entry will focus on data transportation, synchronization and provenance.

By establishing clear priorities for data updates, battlefield commanders can ensure that the most critical information is available right after network restoration.

DATA TRANSPORTATION

Whether toilet paper and milk or fuel and ammunition, logistics ensures that something gets to where it needs to be when it needs to be there. On the battlefield, transporting data comes at a price: detectability. Data sent from one place to another via line-of-sight communication or through a satellite emits a signal. The more data transmitted, the bigger—or longer—the signal. While we want to capitalize on the promise of data, we must do so efficiently. If moving the data to the computing resources has its limitations, so does the alternative: moving the computing power to the data. A local data node that provides an on-premises means for processing data can increase costs because hardware must exist for each node, while size, weight and power restrictions limit capacity.

The Army has settled on a hybrid of a cloud node and multiple local data nodes for the mission command domain. The cloud node provides scalability and flexibility, offering expansive storage and computational power for machine learning and advanced data analytics. It excels in handling large volumes of data and adapts to fluctuating workloads. The cloud node is the central repository for relatively static data, such as personnel and equipment.

The local data nodes, in contrast, offer a more controlled environment. They are reliable and secure, especially when handling sensitive data or operations requiring strict data governance. Their physical proximity to the core operations often translates into faster data processing speeds, albeit with limited scalability compared to a cloud node.

Effective load balancing and using content delivery networks also can mitigate network lag by distributing the data load across multiple local nodes, reducing the strain on any single node and ensuring a more efficient data flow. When real-time data transfer is not critical, employing asynchronous data replication methods can help manage connectivity issues by allowing data to be queued and transmitted when the connection is stable. In short, managing data in a distributed architecture with network challenges involves a combination of technological solutions and strategic data-handling practices to ensure efficient, secure and reliable data flow.

DATA SYNCHRONIZATION

The key difference between a computer network in a tactical environment and a commercial one is availability. If your home internet connection lacks reliability, often the problem is calling from inside your house, and a router reset will put it right. If the issue is outside your control, you switch providers or ask for a refund because, doggone it, you paid for full service.

Resilient data management systems are essential in a degraded network environment with intermittent or unstable connectivity. Robust data synchronization protocols can handle connection interruptions and prioritize efficient data transmission when the network becomes available. Intelligent caching mechanisms can also store and update data locally, reducing the impact of network disruptions.

This reality is another reason for the Army's hybrid data architecture. Ideally, the data in the cloud and local nodes are synchronized. However, the volume of data not only may overwhelm the means of transporting data under ideal circumstances, but also slow to a stop under some conditions.

Once the network is restored in a battlefield environment, establishing priorities for data updates becomes crucial. Not all data must be synchronized simultaneously, as certain information is more time-sensitive or critical than others. Clear priorities ensure that the most important data is updated first, enabling effective decision-making and operational coordination. For example, critical data might include data directly relevant to ongoing operations, situational awareness and imminent threats. Tactical intelligence is important but not as immediate as imminent threats. Finally, less time-sensitive historical data, such as archives, past mission records and lessons learned, can be updated after synchronizing more critical data.

By establishing clear priorities for data updates, battlefield commanders can ensure that the most critical information is available right after network restoration. This facilitates swift decision-making and effective response in dynamic and rapidly changing environments.

PROVENANCE AND MAINTENANCE

As new data sources become available, so must methods to track data from those sources. Machine learning uses known data points to build a model that predicts data within the model's parameters. For example, knowing where munitions fell concerning their target under certain conditions can help predict where munitions will fall under similar conditions, and can be corrected to hit the target more precisely. Because data is only as trustworthy as its source, data provenance is necessary to ensure information security. This has always been important, but with the growth of data and increasing complexity of models, trust now borders on faith that the output is correct.

DOUBLING DOWN ON DATA

A combination of technological solutions and strategic data-handling practices are necessary to ensure efficient, secure and reliable data flow. (Photo by Brett Sayles, Pexels)

An enemy could subtly inject false data that evades notice but impacts the result, such as targeting coordinates. Attackers inherently have the advantage of needing only a single vulnerability and a few moments to breach a system that defenders must always be ready to protect.

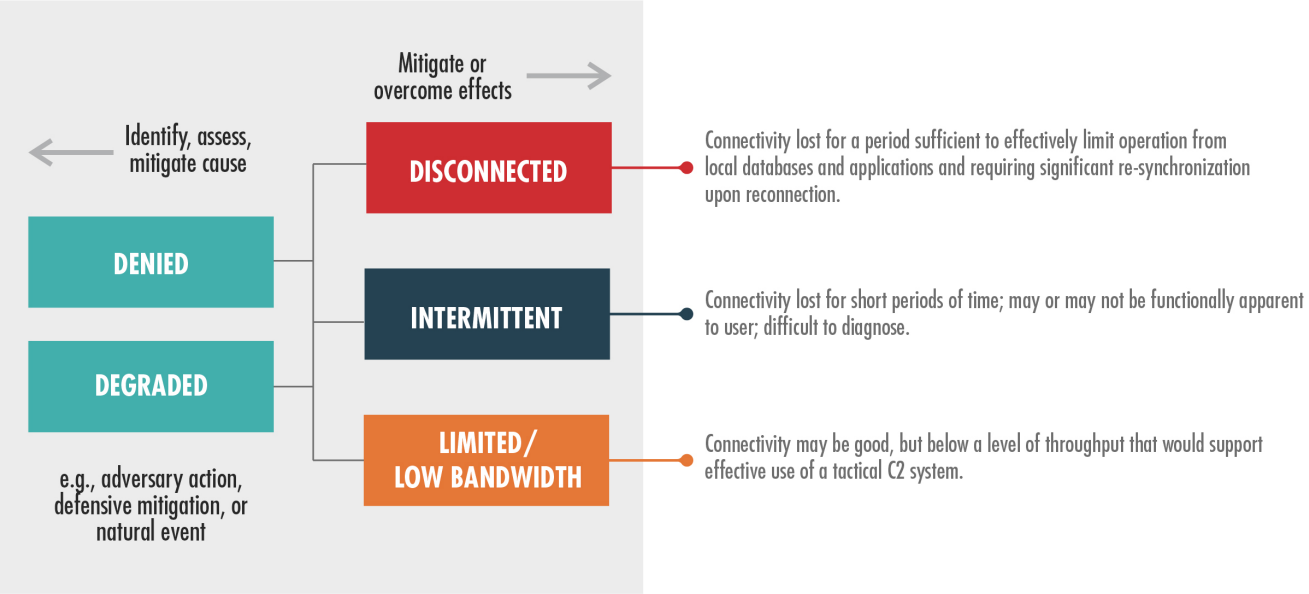
The level of certainty in data, derived from its source, may not appear in the output but is a consideration for how we use that output. Just as we would likely avoid a medication that causes death in 30% of the people who take it, we should similarly reject a targeting system with only 70% accuracy. Fusing data with varying degrees of certainty can be a complicated business. However, confirming data with a second independent source can increase the certainty if it confirms the data from the original source.

Data is also often subject to time constraints. You would avoid using a six-month-old weather report to decide what to wear outside because time-variable data eventually expires, so it must be regularly updated. Data also may need to be updated based on other parameters; for example, machine learning models are subject to drift over time and must be retrained when the drift reaches a particular threshold. As with fielded hardware, there must be a plan to maintain data to ensure its accuracy and quality.

CONCLUSION

This series has demonstrated that concepts underpinning logistics for a hardware system—such as demand, storage and transportation—are also relevant to data. Not only should we think about data in these terms, but we should also plan for it. As data models increasingly serve as battlefield tools, there is an unanswered question about whether logistics for data would fall under sustainment or operations and maintenance from a funding perspective

EFFECTS OF NETWORK CONSTRAINTS ON DATA MANAGEMENT SYSTEMS



CAUSE AND EFFECT

A representation of the causes and effects of network constraints. Resilient data management systems are essential in a degraded network environment with intermittent or unstable connectivity. (Graphic by the authors)

or whether, as data models increasingly serve as battlefield tools, their updates should be a function of acquisition. This must be solved to ensure the availability and integrity of our data.

Personnel is another necessary facet of the data infrastructure. Certainly, we need training, but we also need personnel, such as data engineers, who specialize in getting data from one place to another, responding to demand, and ensuring quality and security.

This series began with the claim that "data is the new ammunition"—but it still doesn't feel real in the way ammunition does. Data is not treated as fungible—the way a 9 mm round is a 9 mm round—so it's often kept siloed as if there's something special about our data versus yours. Logistics implements equalizers—such as how to answer the demand, the availability and use of common data, and getting the trusted data we need from an outside source. If we get these right, we can treat data as a commodity, just like ammunition.

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PREPARE TO JUMP
Soldiers with 1st Stryker Brigade Combat Team, 2nd Infantry Division prepare to move the command post during the Command Post Integrated Infrastructure (CPI2) Validation Exercise on July 26, 2023, at Joint Base Lewis-McChord, Washington. The CPI2 program provides mobile command post capabilities by integrating network and communications technologies into a family of medium tactical vehicle platforms for on-the-move command post capabilities. (Photo by Kathryn Bailey, PEO C3T)

COMMAND & CONTROL ON-THE-MOVE

Future combat operations require a unified network that gives commanders assured voice and data exchange, common operational picture and access to offensive and defensive digital fires.

by Lt. Col. Herb Gamble, Dan Ghio and Kathryn Bailey

The Army expects future large-scale combat operations to be fast-paced and complex, with forces combating a variety of harsh terrains and environments, under constant enemy observation and attack.

Two intertwined capabilities underpin a commander's ability to overcome the demands of such chaotic conflicts: the network and the command and control (C2) systems that run on it. Together they provide commanders and their maneuver formations with the assured voice and data exchange, common operational picture and access to offensive and defensive digital fires needed to combat rapidly changing operational environments.

To be survivable in future dynamic large-scale combat operations, instead of tethered to large, static, equipment-laden command posts, commanders and their C2 systems need to be on-the-move.

"If you watch the news and [look at] the lessons learned from all the operations we're assigned to, [it's apparent that] we can't continue to have this huge command post and be survivable," said Brig. Gen. Marne Sutten, deputy chief of staff G-6, Army Forces Command, during the latest Army Technical Exchange Meeting (TEM) with government and industry partners. "Commanders want a command post that they can utilize at the time of their choosing … to give them the flexibility" they need to conduct different missions.

During the December 2023 TEM 11 in Savannah, Georgia, Army leaders discussed current efforts to design a network architecture that addresses the ever-increasing need for C2 on-the-move. They stressed the importance of aligning technology, people and processes to achieve the overarching unified network needed for resilient data exchange. The goal is also to make network and C2 systems more intuitive and easier to use, while reducing footprint and lowering electromagnetic signature.

"[To be] survivable, we need to be transport agnostic," said Col. Rob McChrystal, commander of the 2nd Cavalry Regiment, during TEM 11. "I'm talking about redundancy and maximum options, whether it's transport from the terrestrial layer to multiple types of low Earth orbit to medium Earth orbit to geosynchronous Earth orbit [satellite communications]. We need to have those options, and ultimately, we want to get to the point where that's automated, and we're able to auto transition when they fail."

McChrystal emphasized several key characteristics he needs for his formation to fight mobile and dispersed. These include enhancing survivability through a transport-agnostic network design that maximizes and automates numerous signal transport options; and smaller, more flexible systems that can adapt to different missions. Interoperability with joint and multinational mission partners plays a critical role, he said, as well as the need to be data-enabled, with a nonproprietary, easily integrated data fabric. Looking forward, predictive data to support commanders' decision-making—leveraging capabilities such as human-machine teaming, automated running estimates and simulations—will be imperative to a future fight against a peer or near-peer adversary, he said.

"This is important because of the pace of technological change," McChrystal said. "That means we have to understand faster; we have to understand risks; we have to understand opportunities faster and we have to make faster decisions."

The Army is looking to its industry partners to help it reach its C2 on-the-move network goal and will welcome both programmatic and technical input to help design capabilities that increase survivability, provide flexibility and deliver network resiliency for commanders to fight disaggregated or collected regardless of geographic or mission constraints.

REQUIREMENTS

The Army command post directed requirement describes command and control on-the-move as moving or rapid halts in minutes. To meet these requirements, the service must integrate C2 information systems and physical infrastructure to execute core C2 functions. C2 on-the-move systems need to be modular and adaptable based on the different needs of each echelon, formation type, mission and operational environment.

"The command post is just the physical space in which the commander and staff conduct the functions or command and control and doesn't have to be any specific … location," said Col. Charles Ford, Army capability manager for mission command/command posts within the Mission Command Capability Development Integration Directorate. "It doesn't always have to be in the vehicle. It might be in a garage, it might be in a farmhouse, it might be just dispersed on a city block. We want to be modular and adaptable."

The goal is the continuity of command and control, to ensure a resilient network transport that can rapidly recover from signal loss and degradation, and maximize both effectiveness and survivability, Ford said. "We often hear this false dichotomy: If you're survivable, you're not effective. If you're effective, you're static. We need to balance them, so they can both grow together."

REPEATABLE PROCESS

Integrating on-the-move technologies onto vehicles takes time, but that does not mean the Army must wait for the physical vehicle integration to begin designing and prototyping the system. A series of pilot and experimentation efforts provide the Army with the systematic feedback it needs to ensure the network performs as designed for mobile operations. Also, the on-the-move design must be compatible and interoperable with the existing unified network capabilities and a series of verification and validation events are needed.

"The first priority is to ensure the network design supports all types of units, including mounted, dismounted, aviation or sustainment," said Matt Maier, project manager for interoperability, integration and services, under the Program Executive Office for Command, Control, Communications – Tactical (PEO C3T). "Everyone is trying to use the same network and talk to each other, so the preliminary network design has to perform across all unit types and be operationally suitable, survivable, effective and safe."

LESSONS LEARNED

The Army is using lessons learned from initial Command Post Integrated Infrastructure experiments and tests to integrate new command post capabilities onto a JLTV variant. The integrated JLTV is serving as the tactical vehicle platform for a fire support prototype command post design and pilot, which will determine the ability of forward observers to initiate a call for fires missions to the command post headquarters. (Photo by Erika Jordan, U.S. Army Test Command)

From there, lab-based risk-reduction efforts provide information on which network components work in an on-the-move configuration; the need for high throughput, low latency bandwidth; and the ability to function in a dispersed environment, while minimizing electromagnetic signature, he said.

A system-of-systems command and control on-the-move kit can then be integrated into a limited number of vehicles and fielded in small quantities to an operational unit to support further field-based risk reduction efforts, before putting the vehicles into an operational evaluation or larger Soldier touch point. The last piece of the process puts the integrated vehicles in an active Army unit that can assess the operational effectiveness at a combined training center rotation, followed by insertion into real-world operations.

"We're really trying to get after this kind of repeatable process for any type of C2 on-the-move effort," Maier said. "These series of events happen concurrently, with some units participating at various stages, to allow for the insertion of up-and-coming technologies that we keep in our C2 on-the-move incubator."

The Command Post Integrated Infrastructure (CPI2) program implemented this process by partnering with the 1-2 Stryker Brigade Combat Team (1-2 SBCT), under 7th Infantry Division at Joint Base Lewis-McChord, Washington. In 2023, the 1-2 SBCT was the first unit equipped and fielded in the Army with CPI2 capability, which provided modular command post capability that integrates network and communications technologies into a family of medium tactical vehicle platforms, replacing existing tent-based command post capability.

These vehicle-based command posts enabled the unit to displace and then emplace the command post and its supporting command post functions into the operational environment, demonstrating the first step in enabling future command and control on-the-move technology designs that work in mobile

command groups and tactical vehicles such as Strykers, Armored Multi-Purpose Vehicles (AMPV), and now the Joint Light Tactical Vehicle (JLTV), which features a prototype command post design and is part of a pilot to determine the ability of forward observers to initiate a call for fires missions to the command post headquarters. The Army plans to assess the JLTV prototype in a Soldier touch point with an operational unit this year.

"Based on the unit, you get a formation-appropriate and mission-appropriate command post kit for a variety of vehicle platforms," Maier said.

MISSION COMMAND ON-THE-MOVE

Two new mission command components are expected to help modernize command and control on-the-move and optimize the capabilities focused on large-scale combat operations: the Mounted Mission Command-Software (MMC-S) and the Mounted Mission Command Transceiver (MMC-T). As a replacement to the Joint Battle Command-Platform software, MMC-S is an open software platform tactical assault kit, which allows developers to add new functions over time. Last spring, the 82nd Airborne Division conducted C2 on-the-move using the MMC-S during a successful operational test.

"Soldiers appreciated the software for its simplicity, intuitiveness and common look and feel," said Col. Matt Paul, project manager for mission command, under PEO C3T. The biggest critique from Soldiers was that they did not wish to be tethered to the platform, which developers used to innovate and port the software into a commercial tablet, he said.

"We built in the ability for the tablet to connect to any network point of presence in the formation, such as tactical radios, Wi-Fi and upper TI [tactical internet] local area network," which provides Soldiers with a dismounted common operating picture and chat function that is available any time during the fight, Paul said.

Developers also ported the software into a cloud environment, which will be evaluated in a future Soldier field assessment to inform requirements and acquisition strategies.

For the hardware, the MMC-T will replace the current legacy receiver to provide multiple transport capabilities such as low Earth orbit, geosynchronous Earth orbit and line-of-sight waveforms, which are critical to the large scale combat operations contested and congested environments. The MMC-T is moving into low-rate production in 2025.

In addition, many of the C2 technologies today will integrate into the C5ISR/Electronic Warfare Modular Open Suite of Standards Mounted Form Factor. C5ISR/Electronic Warfare Modular Open Suite of Standards will make use of a common chassis that will accept "cards" that are embedded with capabilities such as positioning, navigation and timing, electronic warfare technology, mission command applications and radio waveforms, which will enable the Army to reduce size, weight and power restrictions and keep pace with the speed of technology as it evolves to help outpace the threat.

SOFTWARE TEST

Soldiers with the 2nd Brigade Combat Team, 82nd Airborne Division conduct an operational test using Mounted Mission Command Software (MMC-S) Version 3.1 in May 2023 at Fort Cavasos, Texas. The MMC-S provides on-the-move accurate digital command and control and situational awareness. (Photo by Mark A. Scovell, U.S. Army Operational Test Command)

C2 OTM: ENHANCING ARMORED FORMATION SURVIVABILITY

In light of the critical need to enhance C2 on-the-move (OTM) to outpace the enemy in future large scale combat operations, the Army is setting the stage for the second phase of its Armored Formation Network OTM Pilot. The first phase of the pilot was held in February 2022 at Fort Stewart, Georgia. During Phase II, which is expected to begin later in 2024, the service will further evaluate new and emerging commercial OTM line-of-sight and beyond-line-of-sight network transport and baseband technologies to be integrated onto select armored vehicles. The Army will also evaluate small quick-halt terminal solutions that can be pulled off the back of the platform and set up in minutes when additional bandwidth is needed.

REMOTE COMMUNICATION
During the first phase of the pilot in February 2022, 1st Lt. T.J. Allen, the communications and network officer assigned to 2nd Armored Brigade Combat Team, 3rd Infantry Division, communicates with the brigade headquarters from inside his network-integrated tracked vehicle at a remote location at Fort Stewart, Georgia, in February 2022. (Photo by Amy Walker, PEO C3T Public Affairs)

This OTM network equipment set will provide armored formations with the data and communications commanders need to make and execute rapid informed decisions in both offensive and defensive operations. “We understand clearly that in future large scale combat operations, remaining static in one location will threaten the safety of our Soldiers,” said Col. Stuart McMillan, project manager for Tactical Network, at PEO C3T. “In response, we’re building that resilient, transport agnostic, on-the-move network needed to enable data exchange, C2 and decision dominance in future fast-paced conflicts against more advanced adversaries.”

The Armored Formation Network OTM design will be modular and standardized, enabling systems to be integrated across various platforms for mobile upper tactical transport network communications and C2 OTM. Because of the modularity, units will be able to quickly install, replace or add components that pertain to their particular missions. Considerations for C2 node survivability include mobility, resiliency, dispersion and electromagnetic signature, as well as size, weight and power to accommodate armored vehicle space limitations.

Phase II of the Armored Formation Network OTM Pilot will validate OTM solutions for production and integration and inform decisions on the integration of new technologies on Strykers, AMPVs and JLTVs. However, for the pilot itself, the Army may integrate systems on legacy platforms that are more readily available and less disruptive to unit operations. Phase II will inform and recommend a family of OTM solutions, enabling units to select capabilities from the available options to meet the requirements of each echelon and mission. “We want to reduce complexity for our Soldiers, and increase the agility and flexibility needed to fight and communicate on the move in any combat scenario,” McMillan said.

Some of the Armored Formation Network OTM Pilot Phase II technologies to be evaluated include high throughput, low latency, multi-orbit satellite communications and more resilient waveforms and line-of-sight capabilities. It will also include automatic primary,

alternate, contingency, emergency (Auto-PACE) bandwidth diversity capabilities, which automatically choose the best signal pathways for congested network traffic or reroute signals when a single transport option is down or is contested, such as enemy jamming.

The pilot will evaluate a near-term solution but continue to identify and assess emerging technology that can be incorporated into future iterations. To lay a strong foundation for future modernization and easy integration of emerging technologies, the Army will own the Armored Formation Network OTM design, steering away from proprietary solutions whenever possible. Following the pilot, the system integrator will deliver the technical data package to execute a competitive contract of existing indefinity delivery/indefinite quantity contracts (which provide an indefinite quantity of supplies or services during a fixed period) for procurement and integration of follow-on system fielding, McMillan said.

"Command and control on-the-move is critical to survivability and lethality, whether the unit is fighting disaggregated or collected," McMillan said. "We have to provide our commanders the ability to access the data they need to make rapid informed decisions; and this is especially true for our armored formations—the Army's most lethal force."

"Soldiers appreciated the software for its simplicity, intuitiveness and common look and feel."

CONCLUSION

The Army is enabling command and control on-the-move through rapidly configured, transport agnostic and persistent data services, providing flexible on-the-move access to core capabilities at echelon.

"For on-the-move we need something that's smaller in form factor, even in a Stryker unit," McCrystal said. "We need to adapt to take a [Soldier] out of a Stryker and put him into the basement of a building. That's what's going to give us the capability to [operate] dispersed."

For more information, contact the PEO C3T Public Affairs Office at 443-395-6489 or email ***usarmy.APG.peo-c3t.mbx.pao-peoc3t@mail.mil****.*

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BRYCE BETZ

COMMAND/ORGANIZATION: Product Manager Force Sustainment Systems, Program Executive Office for Combat Support and Combat Service Support

TITLE: Assistant program manager, Tactical Environmental Control Systems

YEARS OF SERVICE: 4

DAWIA CERTIFICATIONS: Foundational in test and evaluation

EDUCATION: M.S. in health science, with a concentration in the biomedical sciences, Quinnipiac University; B.S. in biology, Lebanon Valley College

X-Y-Z IS EASY AS 1-2-3

When Bryce Betz joined Product Manager Force Sustainment Systems as an assistant program manager in January, he thought he'd be easing into a new role but, much to his surprise, the first six months of his career with the Army Acquisition Workforce was, according to him, full of new opportunities and "action packed, indeed."

While learning about his new role, Betz also took on the challenge of delivering status updates before a panel, and fielding questions. It was not long before he realized he'd need to hone his public speaking skills and absorb as much knowledge as possible, in a short amount of time, because there would be occasions he'd be thinking on his feet.

"I oversee a program that is in the middle of some major milestones within the acquisition life cycle, and I've had to stand in front of the milestone decision authority a handful of times to brief them on our progress and ask for a decision," he said. "Those moments are certainly important, not only for the program's development, but also my professional development as an employee. Public speaking skills, the ability to think and respond to questions, and handling adversity when a decision comes are all put on display in real time during those moments. And that has been super impactful to this point."

That's not to discount his other responsibilities, which are just as impactful. There are numerous platforms used throughout the Army, he said, that require environmental control from our systems for operations in areas of contested logistics, such as medical facilities, shelters and mobile targeting units. "Being able to manage programs that provide that type of cooling and heating capability to the greater Army for improved probability of mission success is something I find extremely satisfying and take pride in."

"When you change the way you look at things, the things you look at change."

Betz said he was asked to complete a career road map upon onboarding that really made him think about his career path, personally and professionally, and ways to develop strategies to achieve his desired goals. "It was an overview of where I saw myself for the next 30 to 40 years. That is something that I never had really done, to look at a career timeline on paper in that fashion. It was super impactful to see that if I wanted to get to X-Y-Z, then I need to accomplish 1-2-3 before that in terms of trainings, classes, etc. I took a lot of value out of that particular task and the follow-up discussion with my supervisor after it was complete."

Before joining the Army Acquisition Workforce, Betz served as a scientist and an action officer to the commanding officer at the Naval Surface Warfare Center, Indian Head

Division for three years, but felt it was time to try something new. "After spending the last handful of years as a Navy civilian in a more technical role, I wanted to make the transition to program management and actively sought this position out," Betz said. He found and applied for his current position after seeing a post on USAJobs. "Not only was it a move made for the advancement of my professional career, but it also reunited me with loved ones in a different part of the country, so it was a win-win."

"One of the most appealing aspects of the work within program management, specifically for me, is that there are clearly defined benchmarks like cost, schedule and performance. Although, how you get to a point of success within those metrics can vary greatly. This presents unique challenges and opportunities with each program, and that is something I enjoy," he said.

Mentoring is another opportunity that Betz has enjoyed. His program executive officer recommended a class on mentorship offered by an outside agency exclusively to Project Manager Expeditionary Energy and Sustainment Systems personnel, which he found beneficial. His biggest takeaway was that even though a mentor is mostly responsible for passing knowledge, wisdom and lessons learned to the mentee, there are plenty of opportunities for a mentor to learn from the mentee throughout the course of those interactions.

"The mentor-mentee relationship is meant to be a two-way street that both parties can benefit from," he said. "And I think that really changed my perspective for the better; I would definitely recommend the class to those interested."

"You only fail when you stop actively working towards a solution."

As a 20-something, Betz said, he hasn't had the opportunity to work with too many people who are more junior than himself. But a piece of advice he would offer to anyone young and just starting out their career is, "When you change the way you look at things, the things you look at change."

Oftentimes, accomplishing tasks at the working level is a collaborative effort. Scientists, engineers, logisticians and others all have unique perspectives based on their education and experiences. When collaborating in those team environments, he said, it's important to use those varying perspectives and ensure that the work is being looked at from every angle. "Seek out the opinions of others. Ask questions. Try to use an alternate perspective. In acquisition specifically, look at the widget or project from the eyes of the end user. Think to yourself, 'What would a warfighter think of XYZ?' That is a powerful frame of reference to utilize."

One of the greatest lessons he said he was fortunate enough to learn early on in his professional career is to accept that things won't always go your way. "You will be told 'no,' you will make a mistake, and you will probably come across a point in time where you think you've failed. But you only fail when you stop actively working towards a solution."

Betz said he applies the proverb "the master has failed more times than the beginner has even attempted" to his work in a fairly straightforward way. "Sometimes you just have to write things down on a whiteboard for a couple of hours in order to see all of the possible angles to a particular situation and explore all possible avenues in order to accomplish a goal."

Outside of work, Betz believes he is known for always pushing himself to go further. "I enjoy doing things that are challenging," he said. "I grew up playing sports, and while I was fortunate enough to engage in collegiate athletics at the [NCAA] level, playing sports never stopped for me when school did." He also enjoys golf, which, he said, is a sport "defined by how badly you miss a shot and is inherently difficult." Exercise is also part of his daily routine which, he said, takes time and patience; results don't happen overnight.

"While it's easy to get frustrated over missing a shot on the golf course or missing a lift in the gym, it's important to remember that those things are bound to happen eventually, and how you respond to those mistakes is what truly defines long-term success," he said. "Professional baseball players make fielding errors and are considered elite hitters if they fail seven out of 10 times. The same can be said for work. Everybody makes mistakes and things won't always go your way, but how you respond to those challenges makes a world of difference in the long-term outcomes."

—CHERYL MARINO

(Graphic provided by PEO EIS)

INNOVATING THE FUTURE

The evolution and impact of MilTech.

by Melissa S. Westcott and Jacqueline M. Hames

In the dynamic realm of defense operations, DOD continually seeks to enhance its technological prowess and operational efficiency. At the forefront of this endeavor is Military Technical Solutions (MilTech), a program that provides collaboration and information-sharing information technology (IT) products and services. MilTech—part of U.S. Army Program Executive Office for Enterprise Information Systems' (PEO EIS) Enterprise Services portfolio—is multifaceted, aiming to support the Army acquisition community with integrated, collaborative solutions. MilTech's offerings help increase the efficiency and operational performance of the Army Acquisition Workforce through a collaborative consortium that provides an intricate web of services.

BRIDGING ORGANIZATIONAL AND ENTERPRISE IT DIVIDE

MilTech is a mission-funded and cost-reimbursable non-acquisition category program that provides solutions connecting the acquisition community and closing the gap between organizational and enterprise IT. MilTech assesses shortfalls in what the Army enterprise currently provides, and what the acquisition community needs, anticipating and responding to shifts in requirements and shaping the MilTech portfolio of offerings accordingly. Foremost among MilTech's activities is aiding the acquisition community in using Army enterprise offerings such as Army 365 (A365) more efficiently.

MilTech offers key capabilities and support essential to fostering collaboration and enhancing information sharing. MilTech's Team C4ISR [Command, Control, Communications, Computers Intelligence, Surveillance and Reconnaissance] Acquisition Network (TCAN) delivers customer-centric services that cater to specific needs, including application development, cloud migration and hosting within the Cloud Army (cARMY) environment. MilTech's portfolio of solutions includes business intelligence, information and document management, personnel accountability, program and project management, and workplace collaboration offerings. MilTech employs the MilTech Solutions Consortium model as its delivery mechanism for this set of core capabilities and solutions that adapt to meet customer demand.

THE COALITION OF THE WILLING

Since its inception in 1998, the MilTech Consortium, dubbed the "coalition of the willing," has been a catalyst for collective innovation and fiscal efficiency within the Army acquisition community. The consortium provides a framework for member organizations to co-invest in solutions, share expertise and pool resources. It has enabled informed decision-making and application sharing, which not only fosters a united front within the Army, but also leads to substantial cost avoidance.

In a landscape where technological nimbleness and fiscal judiciousness are priorities, MilTech has positioned itself as a leader in delivering efficient and effective IT support services. This model both alleviates financial pressures on individual entities and cultivates opportunities for technological growth and innovation.

"MilTech is a value add for my organization," said Chris Harris, chief information officer (CIO) for PEO Combat Support and Combat Service Support (CS&CSS). "As the CIO for PEO CS&CSS, I find their support system to be an integral part of my overall IT program. Their subject matter expertise and

SECURE SUITE

MilTech developed and delivers the milSuite platform, which reaches over 2.3 million users across DOD, facilitating communication and collaboration across organizations. Featured in the Fall 2023 edition of Army AL&T, the article "Enabling Network Convergence" highlights this social business tool. MilSuite is made up of a suite of secure, online tools and applications specifically designed to enhance collaboraton and information sharing. Its mission is to bridge the gap among users from all DOD branches, to foster learning, education and training, and to serve as a conduit for innovative ideas and concepts that drive positive change.

LOCATION INFORMATION

One primary example of how MilTech is responding to the Army's changing needs is the Manpower Information Retrieval and Reporting System (MIRARS). MilTech developed MIRARS in response to a critical situation that took place on an Army installation, which highlighted a lack of tools available to account for personnel quickly and accurately. MIRARS stands out as a mobile-ready personnel accountability tool that grants organizations comprehensive oversight of their workforce's current locations and enables instant communication through a notification feature.

Data is ubiquitous but challenging to wrangle.

consortium member meetings help keep me informed of cutting-edge technologies, and the CIO In the Know [consortium member] forums give me the strategic edge I need to lead change across the formations in my organization."

ARMY 365 CHALLENGES AND OPPORTUNITIES

MilTech is undergoing a strategic transformation, shifting from traditional on-premises services to embracing the cloud through A365 SharePoint Online software-as-a-service (SaaS) offerings. This evolution will allow MilTech to offer the consortium a suite of A365 development and solution implementation services. While the U.S Army Network Enterprise Technology Command (NETCOM) manages A365, MilTech helps consortium member organizations use A365 more efficiently. Applying the consortium model to A365 adoption drives innovation and allows for collective requirements gathering and sharing of ideas.

As part of this change, MilTech is maximizing efficiencies through the A365 Solution and Services Center. MilTech's A365 Solution and Services Center delivers dedicated Power Platform solution development support, provides a portal for information sharing related to all things A365, facilitates targeted user forums, manages a common solutions app store, delivers training and reference materials and courses, and creates related marketing and graphics products, among other offerings.

MilTech's current portfolio contains over 40 Power Apps and Power Automate solutions developed by MilTech SharePoint developers who are part of the MilTech core team or dedicated to specific customer organizations. The solutions are tailored to meet the diverse needs of the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)) and the program executive officers. MilTech's agile approach to software development is comprehensive, involving SharePoint developers, site collection administrators, content managers and project managers. Together, they collaboratively define requirements and design, develop and deploy solutions, ensuring a seamless, end-to-end, agile software development life cycle. MilTech manages a shared applications library to encourage sharing and reuse of solutions.

DRIVING DATA-CENTRIC INNOVATION

Data is ubiquitous but challenging to wrangle. By using Power BI Premium licensing and cARMY Azure services, MilTech can integrate various data sources across different functional areas, such as Manpower, the General Fund Enterprise

WILLING MEMBERS

The MilTech Consortium stands as the bedrock of this cost-sharing framework, offering bundled services tailored to the multifaceted requirements of the Army acquisition community. These services span from A365 SharePoint Online and Power Platform services to value-added services, including Consortium Support Representatives (CSRs), training, marketing and help desk support.

The Consortium's membership includes 10 distinguished organizations:

- The Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology.
- U.S. Army Combat Capabilities Development Command (DEVCOM) Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center.
- Headquarters Department of the Army G-8-Force Development.
- Joint Program Executive Office Chemical, Biological, Radiological and Nuclear Defense.
- Program Executive Office Command, Control, Communications-Tactical.
- Program Executive Office Combat Support and Combat Service Support.
- Program Executive Office Enterprise Information Systems.
- Program Executive Office Intelligence, Electronic Warfare and Sensors.
- Program Executive Office Missiles and Space.
- U.S. Army Rapid Capabilities and Critical Technologies Office.

Business System, the Defense Travel System, Foreign Military Sales, the Defense Security Assistance Management System and Global Combat Support System – Army, to provide ASA(ALT) organizations the ability to create a common operating picture for their commanders and business leaders.

MilTech acquired a Power BI Premium subscription and makes that resource available to consortium member organizations. MilTech helps them define their Power BI approach and manages Power BI Premium workspace requests. Power BI Premium Capacity Services provide enterprise-grade business intelligence capabilities that elevate the analytical prowess of organizations. This service allows organizations to publish and manage curated data sets, dashboards and reports, offering unrestricted access to A365 users with the appropriate consumer permissions. Premium features of this service include a dedicated and customizable processing capacity, advanced artificial intelligence (AI) tools, and the ability to refresh data with increased frequency. These enhancements help organizations fully exploit their data assets, fostering more informed decision-making and yielding strategic insights.

MilTech offers key capabilities and support essential to fostering collaboration and enhancing information sharing.

Power Platform Premium Capacity Services offer an environment for crafting, expanding and securing a wide array of applications, web pages and workflows. MilTech uses Microsoft Dataverse, a cloud-based secure and scalable environment for data storage and management, for robust relational database management. Additionally, MilTech uses Power Pages for creating customizable web pages and offering enhanced application programming interface support and access to Microsoft's premium connectors to further empower organizations to push the boundaries of innovation and efficiency in application development.

Power Platform Premium Capacity and Power BI Premium Capacity are not just tools; they are the building blocks of a more agile defense community, enabling users to craft applications and analyze vast datasets with speed and precision. As MilTech looks to the future, these offerings are intricately woven into a broader vision that anticipates and adapts to the evolving needs of the Army.

"MilTech's Consortium Support Representative (CSR) model has been fantastic from a CIO perspective because it allows me to integrate a member of the MilTech team within my mission," said Carl Bridges, CIO for PEO Command, Control and Communications - Tactical. "This way, they can expose solutions to me in real-time while taking gaps back to MilTech for solutioning."

MilTech provides a group of IT professionals with experience ranging from tactical information systems operating in a disconnected environment to major enterprise systems providing business functionality to thousands of users. For example, while we resource major programs to support the Army's Fires mission, MilTech designed and delivered the IT solution that provides weather data that the Fires community requires.

"MilTech's range of experience enables them to flex when needed to address unknown requirements. Having this expertise on hand is invaluable," Bridges said.

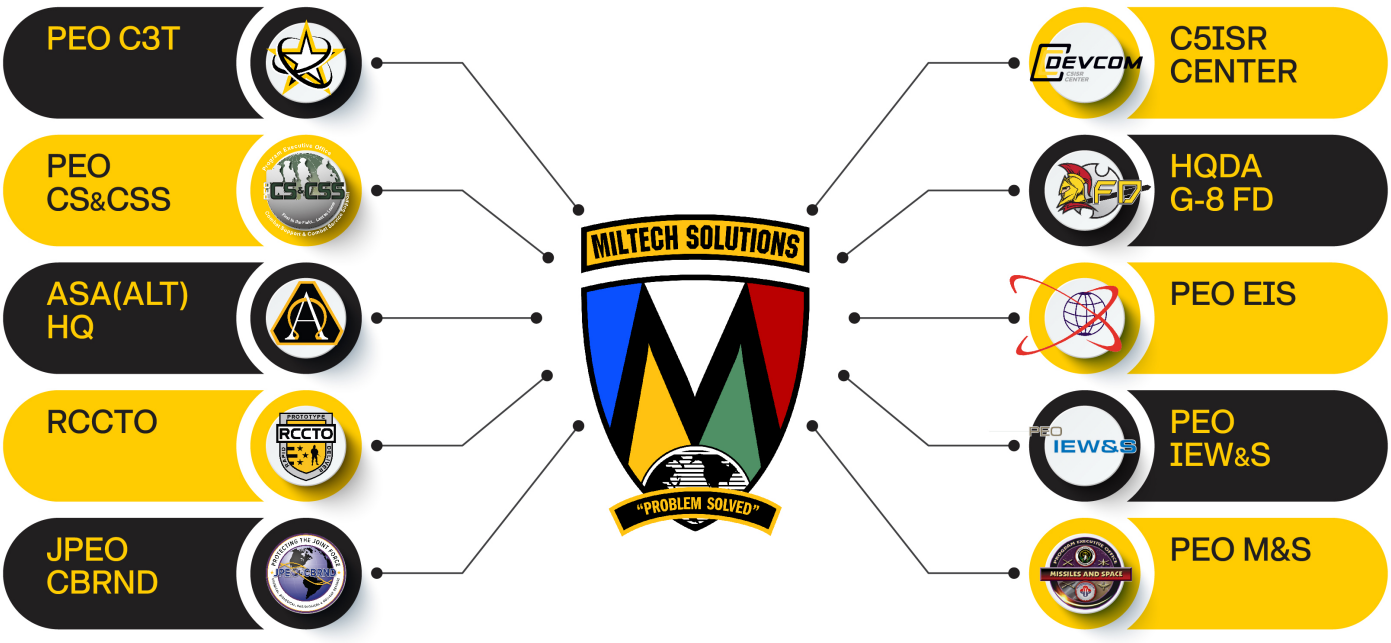
WHERE MILTECH IS HEADED

MilTech is charting new territory in the defense IT domain with its proactive embrace of AI and machine learning (ML) capabilities, in line with emerging Army policies and governance structures. The organization's strategy is rooted in the DOD and Army AI governance frameworks, ensuring integration and use of AI-driven innovations.

MilTech's strategic integration of AI and ML technologies is not simply about keeping pace with technological progress; it represents the program's commitment to steering the course of innovation. By harnessing the power of AI to enhance processes and proactively address the needs of the defense community, MilTech is crafting an IT infrastructure that promises greater efficiency, intuitiveness and alignment with the critical missions of the defense sector. This forward-thinking approach shapes an IT ecosystem that is fully equipped to meet the evolving challenges of the Army acquisition community.

CONCLUSION

MilTech is maximizing the Army's investment in SaaS offerings by providing the support and expertise necessary to help U.S. Army Acquisition Support Center organizations successfully incorporate A365 offerings to meet their mission requirements



(Graphic by PEO EIS)

and day-to-day business needs. MilTech is not only enhancing the technological capabilities of the consortium, but ensuring that members are equipped with the knowledge and skills to leverage these tools to their fullest potential. Together, these services embody MilTech's dedication to enabling a culture of innovation and continuous improvement, ensuring the consortium's members have access to the resources and support needed to thrive in a collaborative and technologically advanced environment.

As MilTech Solutions embarks on this journey, it does so with the assurance that its offerings will not only meet the current demands of the DOD IT landscape but will actively shape its future. The evolving A365 support services and the integration of AI and ML into MilTech's offerings are a testament to the program's dedication to innovation and its commitment to providing the Army community with the tools it needs to succeed in an increasingly complex and technologically driven world.

MilTech continues to welcome new PEOs into the consortium. With the inclusion of new members come new ideas and focus areas. MilTech is growing its portfolio of offerings in response to customer demand and Army priorities.

For more information, go to the Project Office MilTech Solutions page on milWiki at ***https://www.milsuite.mil/wiki/Project_Office_MilTech_Solutions****.*

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JACQUELINE M. HAMES is the senior editor with Army AL&T magazine. She holds a B.A. in creative writing from Christopher Newport University. She has more than 15 years of experience writing and editing news and feature articles for publication.

CELEBRATING IN GERMANY
GENM-O members participate in a ribbon cutting at the Sembach Kaserne U.S. Army post in Germany, Aug. 29, 2023. Sembach Kaserne, within the Kaiserslautern district, is the first base within GENM-O's eight network modernization projects in Europe to complete a network migration. (Photo by Christopher Labatte, GENM-O)

REMOVING BOUNDARIES

PEO C3T's Global Enterprise Network Modernization — OCONUS works to make it easy to plug into the unified network from anywhere in the world.

by Justin Creech and Danielle Kress

Atop the Army's modernization priorities is a unified network that integrates data, speed, flexibility and security to enable commanders and warfighters to communicate effectively and make quick, strategic decisions.

Historically, the Army has leveraged theater-centric networks based on location and the tactical or enterprise nature of the mission. But over the last few years, priority has been given to capabilities that remove boundaries and make it easy to plug into the network from anywhere in the world.

Across Europe and the Pacific, some of these modernization efforts have been led by the Global Enterprise Network Modernization – Outside the Continental United States (OCONUS) Product Manager, referred to as GENM-O, within the Program Executive Office for Command, Control and Communications – Tactical (PEO C3T). It is geared toward increasing speed through technologies like the Global Secret Internet Protocol Router Network (SIPRNet), modernizing voice and video, and upgrading infrastructure across numerous sites to support modernized capability.

'PLUGGING IN' TO THE PACIFIC

In Honolulu, Soldiers from the 25th Infantry Division and the 30th Signal Battalion participated in an end-user-device limited user test to help the Army optimize the functionality of Commercial Solutions for Classified (CSfC), across the Pacific region, minus Korea. Global interconnected CSfC allows individual users to access classified information over commercial networks.

"The ability to connect to a wireless or 5G network anywhere in the world is how CSfC helps expand the [Global SIPRNet]," said Albert Chavez, GENM-O Pacific Team senior architect. "If I'm OCONUS and there's a wireless connection right next to me, I can securely connect and download a file that I need to send a commander in milliseconds, as opposed to how our legacy capabilities functioned."

Before the fielding of these new end-user devices, Soldiers had to wait for communication infrastructure to be set up to access the classified network. Now, according to Chavez, if there are any internet connections available—commercial or otherwise—Soldiers can connect and continue their work.

Part of the Army's comprehensive modernization initiative is delivering the SIPRNet worldwide with CSfC as an important part in the Global SIPRNet rollout because of the multiple connectivity options it provides for end users.

"We've already increased the [end-user-device] functionality with additional user applications and features, such as audio-video conferencing," Chavez said.

Across the Pacific in Okinawa, Japan, upgrades have been focused on network flexibility, agility and bandwidth necessary for the Army to execute its mission and maintain dominance over near-peer competitors.

NETWORK MIGRATION

Maj. Christopher Biddie, GENM-O assistant product manager, discusses new network architecture for Sembach Kaserne U.S. Army post in Germany with Andrea Zalasky, GENM-O assistant product manager, and Christopher Hyers, GENM-O senior program manager. (Photo by Christopher Labatte, GENM-O)

The upgrades began with the implementation of a Multiprotocol Labeling System network that provides instantaneous bandwidth without needing to manually re-cable the connection point from one user to another. The previous system, which used a Synchronous Optical Network, did not offer the same flexibility because of its use of static networks, which contained predetermined pathways for the data to travel to reach a specific end user.

"The best way to describe the [Multiprotocol Labeling System network] is to compare it to a cellphone network," says Dominic Ribaudo, GENM-O computer engineer. A Synchronous Optical Network "is a bunch of dedicated landlines where the Army must anticipate the maximum lines shared between general users and first responders. If either reaches its capacity, the receiver would get a busy signal. With [the Multiprotocol Labeling System network], the Army can prioritize mission needs and the first responders will never reach capacity."

MISSION-CENTERED INFRASTRUCTURE

Across Europe, GENM-O teamed with its Army stakeholders to execute more than 45 infrastructure and network modernization projects throughout 11 countries to modernize voice, video, data and mission command from afar solutions.

GENM-O delivered telecommunication room improvements, cabling and equipment installation both inside and outside the facilities, heating, ventilation and air

conditioning, audio visual, video teleconference, wireless efforts and SIPRNet infrastructure modernization.

In Powidz, Poland, in particular, GENM-O's infrastructure modernization enhanced connectivity between buildings through the installation of a wireless bridging system in lieu of fiberoptic cable installations.

The wireless antennas and radios that make up the bridging system transmit encrypted Non-classified Internet Protocol Router Network (NIPRNet) data from one network switch to another at extended ranges. These advancements were necessary as many of the buildings contained little to no IT network support capability due to being built during the Cold War.

In Germany, NIPRNet modernization was again prioritized, completing the first wave of migrations moving users off legacy network equipment and onto current technology with improved architecture. The project involved designing a new network architecture and installing new switching infrastructure at the Sembach Kaserne Army post to connect multiple information technology devices like computers and printers on the same network.

Protection against security vulnerabilities is a huge benefit to the new switches, according to Christopher Hyers, GENM-O Europe Team senior project manager, in addition to larger capacity uplinks, reduced latency and increased end user connectivity capability.

"The increased gigabytes improve the amount of data that can be processed and transferred at one time," said Hyers. "So, the network provides increased capability to transmit voice, video and data at higher rates." Essentially, the network isn't as vulnerable to disruptions as it was with the legacy technology.

"Each switch has dual connections, which means if some other network device fails within the architecture, new routes can be created allowing communications to continue," Hyers said. "It's a rolling wave of migrations, where all these new users are moved to the new network and have new support. It's good to be at this milestone point and have this capability going out to our European theater users."

CONCLUSION

As the network remains one of the Army's top transformation priorities, GENM-O's mission also remains vital. Its network modernization efforts will ensure that—through efforts like the Global SIPRNet, voice modernization, software-defined networking, and more—theaters across the world can seamlessly communicate in support of the Army's mission.

TEST MODE
Chief Warrant Officer 2 Stephen Wallace, 516th Signal Brigade senior network technician, and Dan Marcum, a CACI engineer, test circuits during the GENM-O Pacific Theater's systems acceptance test in Okinawa, Japan, May 12-16, 2023. (Photo by Alexandra Passoff, GENM-O)

For more information, go to ***https://peoc3t.army.mil/Organizations/PM-Integrated-Enterprise-Network/Global-Enterprise-Network-Modernization-OCONUS****.*

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DANIELLE KRESS is a public communications specialist at PEO C3T. She holds a B.A. in broadcast journalism from Wilmington University.

TIME IS TISSUE
U.S. Army Reserve Soldiers assigned to the 412th Civil Affairs Battalion and 5-159th Bourbon Dustoff conduct a medical evacuation simulation training exercise during Operation Viking at Muscatatuck, Indiana, in July 2023. When a Soldier is injured on the battlefield, speed is often a critical factor as to whether they receive the medical attention and supplies they need to survive and return to the fight. (Photo by Sgt. Alexander Kelly, U.S. Army Reserve)

NO TIME TO WASTE

AMLC is using data to help decision-makers anticipate and position lifesaving materiel during large-scale combat operations.

by Joel Cook

In medicine, there is a saying that "time is tissue." What this means is that when a Soldier falls sick or injured on the battlefield, speed is often a critical factor as to whether they survive and return to the fight. A key part of enabling health care at the speed of war is predicting what units will need, and then getting the right equipment and supplies in the right place at the right time—without grossly overestimating or underestimating. Overestimations are unsustainable and wasteful. Underestimations leave units fatally shorthanded.

The Army Medical Logistics Command (AMLC), the Army's life cycle management command for medical materiel, is using data to help leaders plan for the complexity and lethality of large-scale combat operations, predicting what will be needed to sustain critical medical support to warfighters while also reducing resource waste.

DATA SCIENTISTS

There is a new breed of warriors that have become critical to Army modernization: data scientists. These specialists of facts and figures have joined the ranks of most parts of the Army, including AMLC's Integrated Logistics Support Center, which introduced the 1560 Data Science job series into the organization in 2022. AMLC's data scientists provide analysis and analytics services to AMLC's organization, which includes teams of medical logisticians and maintainers at more than 25 sites worldwide.

Under the direction of the Integrated Logistics Support Center's Logistics and Technical Support Directorate, they are aligning medical logistics with the whole-of-Army approach to use predictive logistics to deliver precision sustainment—reliable, agile and responsive sustainment capabilities that enhance materiel readiness, lower inventory consistent with the need to reduce demand, and reduce costs.

Predictive logistics refers to the Army's ability to harness the power of data to forecast units' needs, and then synchronize production and distribution at every echelon.

It's not fortune telling. It's science.

Data analytics provide leaders with real-time situational awareness of their current and future logistics readiness. From this common operating picture, they can predict logistical needs before the demand signal. For example, a demand signal could be a notification from a unit placing an order for more medications. However, the wait for the demand signal could mean the unit may be without critical resources for a period of time. This timing is critical in a contested, denied or disconnected environment where supplies may not be readily accessible or replenished.

LIFESAVING DATA

U.S. Army Reserve Spc. Matthew Harris, left, assigned to the 412th Civil Affairs Battalion, applies a tourniquet to 2nd Lt. Jarrad Hensley during a simulation training exercise at Operation Viking in Muscatatuck, Indiana, July 16, 2023. Predictive logistics can prevent units from being fatally unprepared. (Photo by Sgt. Alexander Kelly, U.S. Army Reserve)

STREAMLINE OPERATIONS

Members of U.S. Army Medical Logistics Command's Integrated Logistics Support Center (ILSC) tour the U.S. Army Medical Materiel Center – Europe in May 2023. From left in yellow vests, data scientists Julia Contarino and Tajesvi Bhat, and Arthur Braithwaite, director of the ILSC's Logistics and Technical Support Directorate. The data analysis team visited to learn more about operations, provide training and support the setup of an analytics dashboard to help streamline operations. (Photo courtesy of the author)

DATA POWER

Data plays a critical role in sustaining large-scale combat operations and multidomain operations. Large-scale combat operations will consume supplies, devices and equipment at a higher rate, causing a significant increase on sustainment demands.

As a subordinate command under the U.S. Army Communications-Electronics Command, AMLC has taken an active role in modernization efforts such as the Army Materiel Command's quarterly Predictive Logistics Summits. These summits bring together professionals from the Headquarters Army G-4, Training and Doctrine Command, Army Futures Command, U.S. Army Forces Command and the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology to develop a comprehensive predictive logistics strategy to support the Army of 2030 and beyond.

For AMLC, the focus is keenly on synchronizing life cycle management for medical materiel into the Army sustainment enterprise. From there, AMLC is using artificial intelligence (AI) and machine learning (ML) to support effective commodity management. A necessary component of applying AI/ML technology is establishing a sound understanding of data, sources and connections.

Algorithm-dependent analysis requires access to clean, accurate and extensive historical data. AMLC's medical logistics in campaigning effort is aimed at streamlining access to quality data by integrating materiel management, maintenance, distribution and information technology into established Army processes and systems. Like all other commodities and capabilities critical to the Army, medical must be captured in a consistent, standard format that supports the use of data in analytic models or algorithms. Without data accuracy, models and algorithms used by data scientists to support precision sustainment will produce fallible results.

To prepare for sustaining the Army of the future, AMLC's data scientists use cloud-based systems, such as Army Vantage, to analyze data captured from diverse military programs and systems. Army Vantage is an enterprise data analytics platform enabling Army users at every echelon and classification level to view comprehensive Army-wide data, analyze trends and make real-time data-driven decisions.

There is a new breed of warriors that have become critical to Army modernization: data scientists.

ANALYTICAL APPROACH

Data scientists often take multiple approaches to different challenges. At AMLC, data scientists are working on developing capabilities in three primary areas:

- **Predictive maintenance:** Using ML techniques to predict medical maintenance requirements before equipment failure. Predictive maintenance will improve medical equipment functionality and longevity while proactively supporting unit readiness for operational needs. Predictive maintenance will aid in identifying patterns and predicting the timing of the next materiel failure, as well as provide a possible solution (e.g., Equipment X is likely to fail in Y days for Z reason; replace part A with part B).
- **Demand forecasting:** Leveraging time-series forecasting algorithms to predict demand for future large-scale combat operations. Through historical orders and supply consumption data analysis, AMLC can ensure warehouses and Army prepositioned stock inventories reflect active requirements and can accommodate future demands. This effort supports reducing waste and diminishing the burden on the supply chain.
- **Simulated scenarios:** Simulating medical materiel requirements in various projected large-scale combat operations environments. By combining information on the effects of the scenario environment and supply consumption rates, these models help AMLC simulate the potential medical logistics landscape in large-scale combat operations.

AMLC's end goal is to allow decision-makers at echelon to anticipate and position lifesaving materiel at necessary roles of care during large-scale combat operations. This involves accurately predicting medical needs of wounded warfighters based on locations, utilization rates and other vital information to optimize prioritization of medical materiel by type and quantity.

CONCLUSION

As the global stage evolves, maximizing the use of data to support informed decision-making becomes increasingly critical to not only staying ahead of our adversaries, but also staying within constrained resources. Data helps leaders make smart decisions. By aggregating multiple data sources from diverse systems into a singular cloud platform to support quality analysis, AMLC's data scientists generate actionable insights.

What medical supplies are being rapidly consumed and what is excess? Which medical devices are most likely to need repair parts soon? When does the device need its next preventive maintenance service?

These insights also provide visibility into what, when and how things may break, as well as what may be needed to be replaced. In kind, this data can also tell us what we don't need to buy—and this cost avoidance can return critical resources to the enterprise. If data tells the story, then data scientists are the writers—making meaning out of a mountain of information and giving leaders a tactical edge. That is why predictive logistics has become so critical to the Army's ability to fight. Data is now the most decisive commodity because resources are not limitless, and time is not a renewable resource.

For more information, go to ***https://www.amlc.army.mil****.*

JOEL COOK is a technical acquisition management specialist and serves as chief of the Technical Information Management Division's Logistics and Technical Support Directorate for the AMLC Integrated Logistics Support Center. He holds a master's in public administration from Brigham Young University and a B.S. in exercise physiology from Brigham Young University-Idaho.

CONTRIBUTORS:

Tajesvi Bhat*, senior data scientist at the AMLC Integrated Logistics Support Center's Logistics and Technical Support Directorate; and* ***Arthur Braithwaite****, director of the Logistics and Technical Support Directorate of the AMLC Integrated Logistics Support Center.*

PRECISION LAUNCHED

Spc. Collin Petrillo, 87th Combat Sustainment Support Battalion, fires an M320 grenade launcher during a qualification event at Fort Stewart, Georgia, Nov. 8, 2023. The Precision Grenadier System is intended to give Soldiers the capability to destroy targets with increased lethality and precision compared with legacy grenade launchers. (Photo by Spc. Duke Edwards, 50th Public Affairs Detachment)

SHAKING THE TREE

After other methods fail, xTech helps PM Soldier Lethality find potential industry partners for the Precision Grenadier System.

by Andrew H. Cline, Maj. Eric B. Forsgren and Travis T. James

In the dynamic landscape of defense innovation, bridging the divide between government requirements and industry's readiness to invest can be a Herculean task. This challenge becomes particularly pronounced when dealing with weapon systems lacking commercial market application or appeal, and when small businesses grapple with financial constraints despite their innovative potential.

Program Manager Soldier Lethality (PM SL), within the Program Executive Office for Soldier, has not been immune to this dilemma. The Precision Grenadier System (PGS) program, which lacks commercial market opportunities and has yet to secure congressional budget approval, faced disinterest from industry. Year after year, market surveys yielded the same results: limited defense industry partners offering untested solutions to address some of the program's requirements.

However, PM SL was determined to kindle industry interest, solicit invaluable insights on PGS requirements, and foster robust competition for fiscal year 2026. To turn this vision into a reality, PM SL recognized the imperative of initiating research and development efforts in fiscal year 2023, positioning the government for a genuine competition by fiscal year 2026.

The solution lay in the prize authority outlined in 10 U.S.C. § 4025, which would offset contractors' investment risks in the PGS program by progressively awarding prize money for each successful phase—phase one, white papers; phase two, technical presentations; and phase three, demonstrations. Notably, the barriers to entry were low, requiring only a five-page white paper describing the proposed PGS solution.

The government's historical challenge to fund innovative programs, such as the PGS, left industry partners disenchanted and disinclined to invest further. PM SL sought to rekindle industry enthusiasm and trust and to foster stronger relationships to overcome this impediment. The team faced resource constraints and needed more time for major capability acquisition- or middle-tier authority-based development efforts. Nevertheless, they were steadfast in their commitment to persuade the industry to invest in and develop PGS prototypes, ensuring readiness for a robust PGS competition by fiscal year 2026. Despite limited initial funds, PM SL was eager to compensate vendors for demonstrations, through traditional procurement mechanisms, based on the Federal Acquisition Regulation (FAR), other transaction authority or Procurement for Experimental Purposes (10 U.S.C. § 4023), were akin to product delivery to the government rather than a mere demonstration.

PM SL ventured into unfamiliar territory by delving into its acquisition resources and authorities. Discovering the prize authority under 10 U.S.C. § 4025, which recognizes outstanding achievements in basic, advanced and applied research, technology development and prototype development for DOD, became a catalyst for the PGS program. PM SL joined forces with xTech to navigate this transformative journey.

XTech is a platform shepherded by Matthew Willis, Ph.D., director of the Army Applied Small Business Innovative Research (SBIR) and prize competitions in the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology. XTech was eager to partner with PM SL to transition competitions into real programs that could enhance defense capabilities, and swiftly became an essential collaborator in this innovation journey.

CATALYZING INNOVATION

The PM SL team's journey toward revitalizing the PGS program started with an initial meeting with the xTech team on April 19, 2023. On June 14, 2023, xTech officially announced the PGS competition. Proposals were due by July 12, 2023. To disseminate the competition announcements, the xTech team adopted both traditional and nontraditional methods. In addition to the conventional announcements on SAM.gov, xTech leveraged the power of social media platforms like Facebook, custom YouTube videos and LinkedIn.

The results were nothing short of extraordinary. The competition announcement resonated with industry stakeholders, as 15 vendors enthusiastically responded to the call. The team quickly selected the first five winners, each receiving $15,000, on Aug. 14, 2023. One of the most remarkable aspects of the xTech approach was its ability to minimize entry barriers, making it a welcoming environment for vendors unfamiliar with government business intricacies. Unlike traditional processes with voluminous solicitations, complex evaluation criteria and numerous FAR and Defense Federal Acquisition Regulation Supplement (DFARS) requirements, the xTech process was expedited through the guidance and resources it provided. A diverse and efficient evaluation team boasting multidisciplinary backgrounds (engineers for weapons, fire control, ammunition and representatives from the requirements community) determined and announced the awardees in just 33 days. In contrast, a traditional approach would have taken an estimated eight months or longer, involving a significant amount of paperwork, reviews and approvals from legal and management experts.

Furthermore, the xTech competition process did not necessitate contract vehicles for awarding prize money. Awardees needed an active commercial and government entity code and a valid checking account. Upon submitting their invoices for the prize money, funds were directly deposited into their accounts immediately obligating and dispersing funds, facilitating a seamless progression in the competition.

PROGRESSING IN PHASES

The initial five awardees accepted the invitation to participate in Phase 2 of the competition. Phase 2 required vendors to verbally present their proposed PGS solutions, showcasing how they intended to develop their systems. On Aug. 29-30, 2023, the five companies presented their PGS solutions. Once again, xTech's expertise and tools played a pivotal role as the panel of judges efficiently evaluated the presentations, enabling them to select

LESSONS LEARNED

As the partnership between PM SL and xTech continues to evolve, several critical lessons have emerged:

- **Swift competition:** The xTech competition process is markedly quicker than traditional acquisition methods, enabling rapid progress through phases.
- **Level playing field:** The xTech approach creates a level playing field, permitting small vendors to compete on equal footing alongside larger vendors for the prize money.
- **Vendor investment:** It's important to note that vendors must allocate resources to participate in the competition and develop prototypes for the final demonstration. The prize money, while a significant incentive, only covers some of the associated costs.
- **Disadvantaged small vendors:** Small vendors, often constrained by limited internal funding, may require additional support to fully unleash their innovation potential.
- **Prize authority:** The 10 U.S.C. § 4025 prize authority, in collaboration with xTech, has emerged as a powerful tool for promoting innovation and collaboration within DOD.
- **Utilizing nontraditional methods:** XTech's innovative use of social media and other nontraditional platforms has proven effective in reaching a more comprehensive array of vendors and attracting their attention.
- **Objective evaluation:** XTech's proprietary software has demonstrated its value by removing biases and normalizing results, providing an objective assessment process that expedites decision-making.

the Phase 2 awardees on Aug. 30, 2023, following the final presentation.

XTech employed proprietary software to ensure fairness and transparency in the evaluation process. This streamlined approach, which could eliminate biases and normalize results, rendered the competition process as objective and efficient. In addition, the vendors received feedback from the judges, as part of the evaluation process, to help them improve future proposal submissions.

The winners of Phase 2, each receiving a $300,000 prize, were announced on Sept. 7, 2023, marking yet another milestone in this transformative journey.

For Phase 3, the winners from Phase 2 will get an opportunity to demonstrate their PGS final proof-of-concept solution to the government. The winner of Phase 3 potentially could be awarded up to $2 million in a follow-on contract or agreement.

Vendors answered the request for feedback regarding the xTech PGS competition. This was especially true for small businesses, which enthusiastically encouraged the Army to continue leveraging this authority. The xTech platform allowed and incentivized them to invest in technologies, aligning with PM SL's original goals. Moreover, vendors praised the competition's ease of entry, relieving them of the need to invest in specialized proposal-writing teams familiar with navigating the complex FAR and DFARS requirements and procedures.

The results were nothing short of extraordinary.

CONCLUSION

The partnership between PM SL and xTech has ushered in a new era of innovation within DOD. By harnessing the power of the 10 U.S.C. § 4025 prize authority and working closely with xTech, PM SL has successfully ignited industry interest in the PGS program, breaking down the barriers that often stifle innovation in the defense sector.

This collaboration has streamlined the competition process, as well as advancements in unique technologies, allowing small vendors to compete alongside their larger counterparts and fostering an environment where groundbreaking technologies can thrive. As the partnership between PM SL and xTech continues to evolve, it stands as a model for future defense innovation efforts. By embracing nontraditional methods, eliminating biases and simplifying the entry process, this partnership promises a brighter, more collaborative future for the defense industry.

As the defense community looks toward the future, the success of the PM SL-xTech collaboration serves as a testament to what can be achieved when government entities and innovative platforms join forces. The lessons learned from this partnership will undoubtedly inform best practices for future endeavors, guiding program executive offices and their workforces toward more efficient, innovative and collaborative approaches to meeting DOD's evolving needs.

In an era marked by rapidly advancing technology and complex security challenges, leveraging innovative approaches and fostering collaboration with industry partners is critical. Through the xTech Competitive Platform and the 10 U.S.C. § 4025 prize authority, PM SL has connected with nontraditional defense industry and laid the groundwork for a more resilient and responsive defense ecosystem. This, in turn, will play a pivotal role in ensuring the readiness and effectiveness of our armed forces, both now and in the future.

For more information, go to ***https://www.xtech.army.mil/competition/xtechsoldier-lethality****.*

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MAJ. ERIC B. FORSGREN is an assistant product manager for PM SL Soldier Weapons. He holds an M.S. in systems engineering management from the Naval Postgraduate School and a B.S. in business administration sport management from Webber International University. He holds a Defense Financial Management Level 2 Certification from DOD Financial Management and a Lean Six Sigma Black Belt Certification from U.S. Army Lean Six Sigma.

TRAVIS T. JAMES is an acquisition analyst for PM SL and spearheaded the prize authority use outlined in 10 U.S.C. § 4025 with xTech. He holds a B.S. in business administration and management from Bloomsburg University of Pennsylvania. He holds a Professional certification in DOD contracting.

CONTRIBUTOR:
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ELIAS VAINCHENKER

COMMAND/ORGANIZATION: Joint Program Executive Office for Armaments and Ammunition, Directorate of Integration

TITLE: Project officer

YEARS OF SERVICE IN WORKFORCE: 24

DAWIA CERTIFICATIONS: Advanced in program management, Practitioner in engineering and technical management

EDUCATION: Bachelor of Engineering in mechanical engineering, Stevens Institute of Technology

AWARDS: Commander's Award for Civilian Service (2012); Commanding General FORSCOM Award for Excellence (2008); Commanding General's Award for Excellence (2006)

SHIFT WITH THE WIND

With over two decades of Army civilian service, Elias Vainchenker said there is "no right answer" to the advice he could give fellow junior engineers for success in the Army Acquisition Workforce. "We typically transition engineers or other math and science careers to project management due to the sheer quantity of such co-located personnel. The primary discriminator of whether someone from a career field based on calculations and precision will be successful in project management is on whether they can shift their mindset to developing decisions with lack of all the information," he said. "Those that pause or hesitate until enough information is collected will have their project paths decided for them based on time," he said, when their alternate options might no longer be viable.

"I advise those entering this field to inflect on their course of actions in only so far as the schedule allows and to make decisions to move forward and to take the risks they are uncomfortable making with the data they currently have," he said.

As the project officer for the Joint Program Executive Office for Armaments and Ammunition (JPEO A&A) under the Directorate of Integration, Vainchenker is responsible for finding solutions to supply chain issues, so our warfighters have the ammunitions they need when they need them.

"In a project management role, we have a daily responsibility to make hard decisions that are worth millions of dollars to the DOD," he said. "Whether it be a production project that requires a decision to direct a contractor to stop production due to test anomalies and conduct a root-cause investigation—which may still result in inconclusive data—to developing programs that require continuous and consistent communication of progress. … It is a unique authority entrusted to us in project management by the U.S. Army."

Vainchenker began his career at JPEO A&A in what he said was a "less complex product portfolio" in pyrotechnic munitions—used for illumination, signaling simulation of battle sounds and effects—transitioning from the U.S. Army Combat Capabilities Development Command in system engineering. He was fortunate to have a mentor to guide him through "a new way of thinking" and introduce him to planning, programming, budgeting and execution, and contracting.

"I was fortunate to have contractors with sufficient expertise and historical product knowledge to be afforded the bandwidth to focus on learning product improvement programs, urgent materiel releases and other approaches to developing capabilities for the user," he said. "As a result, in my first couple of years, I had worked with a broad team to field escalation of force capabilities to Operation Iraqi Freedom [OIF]/Operation Enduring Freedom [OEF)]."

During OIF/OEF, Vainchenker said his experiences included anything from conducting fast-paced safety tests to demonstrate the risk of shooting pen flares at windshields of approaching vehicles (in order to waive them away from checkpoints), to collaborating

with Public Health Command on health hazard assessments and the environmental community on product improvements.

"These smaller-scale efforts became the building blocks for future career experiences of fielding products in the more complex processes of type classifications, final type qualifications and full materiel releases, allowing me to provide the U.S. Army pen flares, infrared tracer small caliber ammunition, sniper ammunition and new Navy 127 mm artillery munitions," Vainchenker said.

In September 2022, he transitioned to the assured munitions lead, responsible for assessing strategic supply chain risks for JPEO A&A's portfolio of munitions, leveraging the expertise of each program office managing specific products to roll up the strategic aspect of risks.

"Being part of an evolution of the DOD vision of production risk management is a great experience allowing me to leave a lasting impact of how it functions in the future," he said, as data is continuously evolving and tools to capture and communicate risks across the portfolio are still being developed.

The most valuable position Vainchenker said he held in the Army Acquisition Workforce was first line supervisor at the product level. "This is the most challenging and rewarding level of supervision," he said, as it involved being pulled in two different directions due to the need to develop others and remain the backup expert to each team member.

"Essential to each new member of the team being successful is providing enough guidance so they understand the project, while also giving them an opportunity to fall and learn. Providing each member enough room to chart out their project path and, therefore, giving them the space to create new solutions is essential to their investment in the project," he said. "Allowing enough space that they can make mistakes to learn from is essential. It simply needs to be a fall onto a net, not a fall onto the ground—some pain but no permanent injuries."

"The most important lesson I learned is to manage the emotion projected in my recommendations," he said. "Always find a means to separate yourself from the decision so that logic remains the basis of any dialogue and so debate can continue to influence the outcome. Once a discussion becomes positional, someone will lose and the community as a whole gains less."

Resilience is also key. "In your career, it will be essential to remain unphased and driven in the face of multiple obstacles and redirections in your project. Your original plans and vision will be impacted by resources, schedules, shift in U.S. Army or user priorities, leadership visions, contractor motivations or a multitude of other factors," he said. "To understand your project path is not a road traveled linear by car but, rather, a boat set on a course across a shifting sea." According to Vainchenker, each compromise and adjustment is part of the process to create a community solution. "Being a champion for your project is not related to your vision, but rather a general capability that you represent on behalf of your user, ensuring a usable product remains in the hands of Soldiers. Therefore, you must give it your all each day you come into work regardless of how far you are from the path you originally envisioned."

MOVING WATERS
Vainchenker kiteboards primarily in Cabarete, Dominican Republic, because of consistent onshore winds. He has also kiteboarded in Kenya and Mexico, with more places to be added in the future. Like project management, he said, the sport and the career field require 10 years to hone the skills. (Photo courtesy of Elias Vainchenker)

Outside the office, Vainchenker continues to give his all mastering a new sport. "Currently, my focus is learning kiteboarding and has become a significant part of my lexicon," he said, also comparing kiteboarding to project management. "It is always moving regardless of if you are ready or not … there is no time for perfection. The kite itself is slow to initially accept a change in direction, but after consistent input it will divert and speed up in the new direction beyond your expectation." In project management, Vainchenker said that consistent input and communication of the desired direction is the only way to create a shift.

"Both the sport and career field require 10 years to hone the skills enough to be able to understand well enough to identify the mechanics and performance of others in the same field from a distance—allowing you to offer advice for them to refine their performance."

—HOLLY DECARLO-WHITE

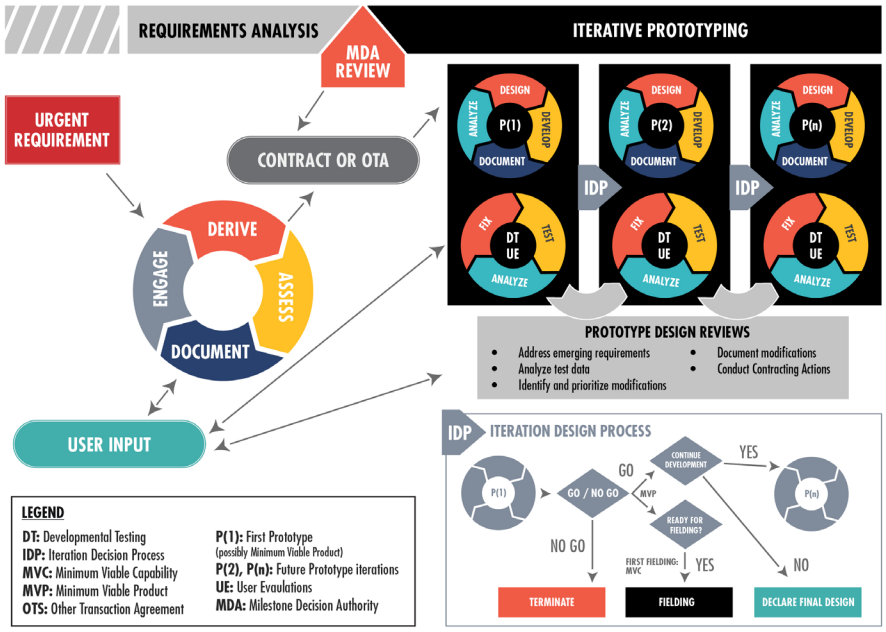
AGILE ACQUISITION FOR . . .
HARDWARE?

Agile processes using minimum viable product strategies enable hardware development to deliver capabilities at speed.

by Joseph Novick

In 2020, the Department of Defense outlined its DOD Instruction 5000.02, "Operation of the Adaptive Framework," to provide program managers with a variety of options for acquiring weapons systems and defense capabilities. Its goals included empowering program managers to execute simplified and tailorable acquisitions, data-driven analysis and active risk management, while emphasizing sustainment to deliver capabilities faster through the acquisition process. While DODI 5000.02 is a framework that enables flexibility in acquisition, it does not present program managers with methods to shorten programmatic timelines.

Through the Urgent Capability Acquisition process, two programs—the High Mobility Decontamination System (HMDS), a terrain chemical agent decontamination trailer-mounted capability, and the Negatively Pressurized Conex (NPC), a portable isolation room built inside a steel shipping container in order to keep infectious patients from



FAST MOVING

The minimum viable product process for hardware development used in the urgent needs pathways to develop the HMDS and the NPC. (Graphic by the author)

contaminating others on the aircraft transporting them—delivered urgent capability at lightning speeds by using a hybrid approach to acquisition. These programs tailored their acquisition process using methods typical of agile software development despite being hardware-centric systems. Software development companies focus on agile strategies as a primary project management structure; however, agile project management is not common in hardware development in DOD acquisition. The HMDS and NPC teams used minimum viable product (MVP) and iterative prototyping strategies, pillars of software development, to design, develop, test and deliver hardware systems at the speed of relevance.

Both programs had significant design and development processes and robust test programs while moving in high-pace acquisition environments. The HMDS fielded its initial capability within nine months, and "the first NPC mission was flown 85 days from JUON [Joint Urgent Operational Need] issuance," retired U.S. Air Force Col. Paul "Jimi" Hendrickson said in his 2021 presentation "The Negatively Pressurized Conex (NPC) Program – How Acquisition and Systems Engineering Agility Delivered Capability to USTRANSCOM in 95 Days." The NPC team won the David Packard Excellence in Acquisition Award in 2021, DOD's highest acquisition team award.

This article will describe how program managers can apply agile processes, typical of software development, to deliver hardware capabilities at a rapid pace. It will consider the DODI 5000 definitions of minimum viable product, recommend a new definition of MVP that is inclusive of hardware development, and provide a template for program managers to use MVP and iterative prototyping in hardware acquisition.

WHAT IS AN MVP?

When I talk to acquisition professionals in hardware development and they hear the term "minimum viable product," they tend to think of an end-product with the minimum performance benchmarks to meet a stated requirement. They envision an end-product where features are removed until the product fits within cost, schedule and performance constraints before production and fielding.

Those in software development, however, think of the term in a completely different way. An MVP is an early prototype designed to understand the usefulness or potential demand of a product with the minimum amount of effort necessary. An MVP is a starting point. DODI 5000.87, "Operation of the Software Acquisition Pathway," defines an MVP as "an early version of software to deliver or field basic capabilities to users to evaluate and provide feedback on. Insights from MVPs help shape scope, requirements and design."

This is the only definition for an MVP in the Adaptive Acquisition Framework. Notice that it focuses on gathering information early in the product development cycle. It is a ball of clay ready to be molded. Also notice the definition specifies "software." DOD could modify the MVP definition to incorporate hardware and software. A general definition of an MVP for DOD hardware and software capability development could be "a prototype that provides the program office with enough information to determine that the acquisition is worthwhile as soon as possible in

Direct user feedback and communications throughout this development cycle is critical for success.

the product development process. It may or may not be a fielded product," as defined in my 2022 research presentation to the Naval Postgraduate School, "Minimum Viable Product as an Engineering Strategy for Urgent Needs Acquisition: A Case of the High Mobility Decontamination System."

This definition is inclusive of both hardware and software functional prototypes developed as early as possible in the development cycle. It enables iterative prototype development to add new features and agility to address new or changing requirements.

A TEMPLATE FOR USING MVP IN HARDWARE DEVELOPMENT

Both the High Mobility Decontamination System and the Negatively Pressurized Conex followed an agile approach to hardware development as described in the diagram on Page 99. This hybrid approach uses an MVP strategy and feedback loops that are the centerpiece of the Software Acquisition Pathway but tailored to hardware acquisition. This process emphasizes direct user feedback throughout requirements analysis and prototype development. In the cases of NPC and HMDS, the programs tailored the iterative MVP approach to Urgent Capability Acquisition. A short requirements analysis phase derived performance requirements from Joint Urgent Operational Needs Statements through an engage, derive, assess and document loop with collaborative end user and combat developer involvement. These requirements led to a review with the milestone decision authority (MDA) to approve a sound acquisition strategy, sign key documents, assign funding and green light the contracting strategy.

Both the NPC and the HMDS used other transaction agreements for contracting. These agreements are prototype-centric and enable the MVP engineering approach. Because requirements will not be well defined for agile and iterative prototyping programs, the acquisition and contracting strategies must include "sprint-like" development structures. Considering the rigor involved with modifying hardware, iterations are not true sprints as used in software development that last for one to two weeks. These hardware "sprint-like" iterations may last for several weeks or even months in order to address the redesign or delivery of parts, installation of modifications, or the availability of test fixtures. Both the acquisition and contracting strategies should take these considerations into account.

Once in the iterative prototyping phase, the MVP (labeled as P(1) in the diagram) undergoes a design, develop, demonstrate and analyze feedback loop with direct user and combat developer involvement. The design and development portions of the loop should prioritize schedule over other metrics, as the goal of the MVP is to understand the utility of the capability with the least amount of effort conducted. "Demonstrate" actions include simultaneous developmental or laboratory testing and user evaluations in a test-analyze-fix-test cycle. Direct user feedback and communications throughout this development cycle is critical for success. The program managers must work with the end users and combat developers to prioritize and reprioritize requirements and feature demands based on a consistent flow of new information in the "analyze" action. Design decisions are often made on the spot to keep the test-analyze-fix-test cycle flowing.

At the completion of the development and demonstration of the MVP, the program will undergo an iteration decision process, typically executed with the MDA, program manager, user decision maker and other relevant senior leaders. Based on the information gathered during the MVP development sprint, senior leaders will make a "go/no-go" decision. A "go" decision allows the program to proceed. A "no-go" decision leads to program

DEFINING MVP AND MVC

MINIMUM VIABLE PRODUCT (MVP)
The MVP is a prototype that provides the program office with enough information to determine if the urgent need acquisition is worthwhile as soon as possible in the product development process. It may or may not be a fielded product.

MINIMUM VIABLE CAPABILITY (MVC)
Like an MVP, the MVC is the first iteration that is ready for fielding. It enables the user to meet mission needs with the minimum amount of effort in development. The MVC is both an operational and learning tool for future iterations.

ATOMS VS. BYTES

Agile hardware program managers consider specialized skills like welding, electrical, engine repair, material repair, tailoring, plumbing and other skill sets when addressing hardware prototypes in "sprint-like" events.

termination. It is important to note that decision-makers could determine a "go" decision even if the prototype does not meet benchmarks. The potential of the future iterations to meet risky, yet valuable, benchmarks will also impact the decision.

From the "go" decision, the program will address readiness for fielding as well as the desire for iterative development of another prototype. Production and fielding decisions will require analyses considering performance, production, sustainment and operational risk. The first system that enables the user to meet mission needs is the minimum viable capability (MVC); it is both an operational and learning tool as described in my 2022 presentation. The program office will assess the need to develop future prototypes or modular features against the remaining program budget and schedule.

Should the program office determine the need to develop another iteration, it will conduct a prototype design review. The contractor, program office and the user are the participants as well as other relevant stakeholders. Performance data, emerging requirements, changes to tactics and the realization of other needs will scope the next prototype iteration. The team will reevaluate and prioritize desirable features considering cost, schedule, performance and contracting requirements.

This cycle can repeat or end on a case-by-case basis depending on the performance, schedule and funding constraints of the acquisition.

ITERATION INDEPENDENCE

The independence of each prototype iteration reduces risk. This independence requires that each iteration undergoes its own independent baseline even if the design is similar to previous iterations. Each independent iteration is evaluated on its own merits. The team can mitigate the impacts of requirements creep by reprioritizing or inserting desired features based on performance data or new insights. Design and development for riskier features can continue in an independent iteration while an operationally viable iteration goes into a fielding phase. Additionally, iteration independence enables previous iterations to serve as a fallback plan should risky performance features fail to meet user needs. By using iteration independence, the program manager can deliver operationally relevant capabilities while developing riskier features or modules in future iterations.

CONCLUSION

Tailoring the Software Acquisition Pathway for hardware capabilities is an effective way to get capabilities to the field fast. While the HMDS and the NPC programs demonstrated hardware development using minimum viable products for Urgent Capability Acquisitions, programs using Middle Tier of Acquisition or Major Capability Acquisition pathways could also consider this approach. Agile hardware strategies enable program managers to make rapid decisions during design, development and test while addressing requirements creep in real time. Involving the end user throughout development for feedback will help clarify ambiguities in requirements definition and improve communications throughout system testing to reduce the impacts performance issues and schedule slips. MVP and agile strategies have the potential to enable hardware programs in any acquisition pathway under the Adaptive Acquisition Framework to develop high performing and worthwhile capabilities at astonishing speeds.

For more information, email the author at ***joseph.e.novick.civ@army.mil****.*

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OVERSEAS SUPPORT
U.S. Army Soldiers assigned to 3rd Division Sustainment Brigade, 3rd Infantry Division, board a plane to Europe in July 2023. Members of the Army Materiel Command Analysis Group have been in Europe supporting Army, joint force and multinational partners through predictive sustainment since August 2022. (Photo by Sgt. Demetrysean Lewis, 3rd Division Sustainment Brigade)

ANALYTICS AT THE EDGE

Ongoing European operations confirm logistics is a critical warfighting function.

by Christopher Hill, Ph.D.

Logistics operations in support of large-scale combat operations (LSCO) are complex, and so are the data and analytics that underpin them. Currently, logistics data is managed as a business function. This is because our enterprise business systems facilitate transactions, track movements, and store and manage critical data from the joint strategic support area to the tactical edge. From the tactical edge of ongoing operations today, the reality is that logistics and sustainment operations are about warfighting.

As we build the Army of 2030, and think toward the Army of 2040, we have put new ways of providing decision support at the edge to the test. What we have learned is combatant commanders and the service members they lead have requirements forged by conflict, specific needs that traditional business systems cannot meet. Today's operational environment has revealed that the speed and complexity of LSCO is unprecedented. A paradigm shift is necessary to keep up with this speed.

THE TASK

The Army Sustainment enterprise is leading the strategy for contested logistics. This strategy will require the Army to rethink how it supports the joint force—from using new platforms and rewriting doctrine to exploring autonomous resupply and modernizing the organic industrial base. It will inherently involve predictive logistics, which is getting the right equipment to the right place at the right densities, when commanders need it.

Since August 2022, members of the Army Materiel Command Analysis Group (AMCAG) have been in Europe supporting Army, joint force and multinational partners through predictive sustainment—and the results speak for themselves. The AMCAG has developed several tools to solve problems in support of U.S. and partner and allied operations. What makes these tools cutting edge is not only the capabilities they provide, but that they incorporate data from multinational partners. For example, in the AMC Predictive Analytics Suite (APAS), one of these tools gives a holistic picture of readiness, where leaders can see what is impacting readiness, what could impact future readiness and ways to mitigate risk. It is comprehensive, showing pieces of equipment that are down (for maintenance or indefinitely), which parts are needed to fix equipment, where the parts are, how long the parts will take to arrive and roughly when the equipment will be repaired and ready to use.

PREDICT THE NEED

Simply put, we are identifying problems and solving them before they occur. We are providing decision support and analytics at the

MISSION CRITICAL

Soldiers offload U.S. M1A1 Abrams tanks in Grafenwoehr, Germany, in May 2023. Logistics and sustainment operations are critical to warfighting. (Photo by Spc. Christian Carrillo, 7th Army Training Command)

HEADQUARTERS COMMUNICATION

From right, Maj. Shaun Adams, Chief Warrant Officer 3 Cole Brown and Capt. Daniel Reape use the Tactical Mission Data Platform to communicate with headquarters. Soldiers need data-driven answers on the battlefield as soon as possible. (Photo by Spc. William Kuang, 343rd Mobile Public Affairs Detachment)

edge. As we approach our second year of support, we have learned important lessons in speed, flexibility, accessibility and simplicity.

Speed. The speed of combat is quicker than ever before, and data analytics must be available for decision support at the speed of combat. Commanders do not have the luxury of waiting eight or more hours for a data-driven answer to a question. They need solutions as soon as possible.

For example, operations can shift quickly, and the forward line of troops can move 50 to 100 kilometers in hours. Commanders may require new forces that are integrated and deployed in a few weeks. Logistics and its supporting analytics must stay ahead of these rapid changes.

Flexibility. In addition to the high speed of combat, the nature of combat has changed. At any given time, the battlefield evolves, and so, too, do the problems commanders face. This is one of the many reasons why it is important to have analytics at the edge. Analysts and their solutions must be positioned to support commanders.

While in Europe, and within a period of three months, requirements for data and analytic operations shifted from counteroffensive to force generation to offensive operations. Conditions changed over time, just as they do in large scale combat operations. Historical processes are not agile enough to allow for decision support at the speed of combat. Tools, platforms and supporting contract vehicles must be flexible to adapt and provide predictive and prescriptive capabilities. Tools must be distributed and federated to push analytic capability to the lowest levels.

Tools must also be flexible to allow multiple contractors to operate in within operational headquarters and enable hybrid contractor and organic support. For example, tasks supporting complex use cases were divided between Army civilians and contractors. It was, and continues to be, critical that the two groups were able to work side by side.

Accessibility. The U.S. Army does not fight alone. In operations, we can expect to work with partners in the joint force, as well as foreign military partners and allies.

Current operations include other services, traditional partners like NATO, and nontraditional partners and allies. Each of these need to be able to share data quickly, securely and reap the benefits of advanced analytic operations. This is one of the first times data from different nations is being pulled into a single platform for visualization and analysis to aid decision support.

For example, APAS began as a desktop application. As staff, and then leadership,

The reality is that logistics and sustainment operations are about warfighting.

RIGHT PLACE AND TIME
Logistics data ensures the Army delivers precisely what's needed to Soldiers when and where it is needed most. (Photo by Staff Sgt. Oscar Gollaz, 112th Mobile Public Affairs Detachment)

It's our job to deliver sustainment before expected shortfalls in any operational environment.

saw power in the system and its tools, they wanted access. APAS is now a cloud-based platform that leverages information from Army Vantage and nonstandard data.

Simplicity. In this digital age, simplicity is critical. Typically, a user does not need to take extensive training to use a phone app. Data solutions should be the same way.

For example, the AMCAG team developed the logistics visualization of current operations to support the Security Assistance Group – Ukraine's Commander's Battle Update Briefing in an agile manner, with requirements coming directly from the commander and his staff. This tool continually evolved based on the use of the initial prototypes and user feedback. Adjustments to the tool were made quickly and iteratively. The bottom line is if a data and analytics solution isn't easy or intuitive to a commander or support staff, they will not use it, and it will fail.

CONCLUSION

As the Army continues to modernize, predictive sustainment and analytics will continue to play a critical role. We have advanced capabilities now, in the Army of 2024, and as we test them, we are learning, growing and improving. At AMC, it's our job to deliver sustainment before expected shortfalls in any operational environment. Logistics data ensures we deliver precisely what's needed, and when and where it's needed.

As our Army continues aligning itself as a data-centric organization, we must continue to exploit data to provide solutions and maintain readiness. In addition, we must cultivate a data-driven culture and expand upon pockets of excellence. As logistics data continues to prove its worth on the battlefield, a paradigm shift is needed. We must continue to get decision power in the hands of our commanders—our future readiness depends on it.

For more information, go to ***https://www.amc.army.mil****.*

LEAD THE WAY

Gen. Charles Hamilton, commander of Army Materiel Command, gives opening remarks for the Contemporary Military Forum on "Sustaining the Army of 2040" at the Association of the U.S. Army Global Force Symposium, March 29, 2023. Hamilton and AMC have been tasked with leading the Army's strategy for contested logistics. (Photo by Eben Boothby, U.S. Army Materiel Command)

CHRISTOPHER HILL, PH.D., is the chief data and analysis officer at Army Materiel Command. He has served in various analysis leadership positions since joining AMC in 2012. Before working for AMC, Hill retired as a colonel after serving in the U.S. Army for 26 years. He holds a Ph.D. in industrial engineering and management science; and an M.S. in operations research, both from the University of Central Florida, and a B.S. in industrial operations management from Auburn University.

PIONEERING THE FUTURE WITH THE B-52 LEGACY

TARGET PRACTICE
Two U.S. Air Force B-52H bombers take part in a routine training event in 2022 at the Grafenwoehr Training Area in Germany, in support of NATO allies and regional partners. (Photo by Gertrud Zach, Training Support Activity Europe)

In 1954, the B-52 bomber took its inaugural flight. Today, 70 years later, the B-52 Stratofortress remains an integral part of the Air Force inventory, serving as a living example of adaptability and innovation.

What makes the B-52 so unique is that it was built to be modular and flexible. What makes it successful is that the people working on the program—both government and industry partners—have been agile and innovative in reimagining the aircraft throughout its life span. From new engines to a new radar, the B-52 is continuously updated with the warfighter in mind and a keen eye toward environmental sustainability.

This multifaceted approach positions the Stratofortress as more than just a military asset. It stands as an enduring symbol of adaptability, innovation and a steadfast commitment to a sustainable future.

WHAT IS SUSTAINABILITY

I was recently asked how I define sustainability. My response: "How do you define sustainability?" I responded that way because I bet we'd have different answers.

According to the Army Climate Strategy released in 2022, sustainability is defined as "the property of being environmentally sustainable; the degree to which a process or enterprise is able to be maintained or continued while avoiding the long-term depletion of natural resources."

As acquisition professionals, we have a responsibility to consider environmental implications along with operational significance. Understanding the concept of sustainability is the first step toward purposeful action throughout the acquisition life cycle, from planning to design and production to disposal.

For example, American B-52s are receiving new engines that, according to the Air Force, will see 30% better fuel efficiency and eliminate the need for engine overhauls for the remainder of the aircraft's expected life span. In addition to these benefits, Boeing, the industry partner responsible for designing and building the B-52, says the new engine also will have a positive environmental impact. Specifically, it will come with a significantly smaller carbon footprint—less than 5% of the footprint of the current engine. This demonstrates the importance of collaboration with our industry partners in achieving sustainability. In our strategic approach to acquisition and the integration of systems of systems, sustainability holds a pivotal role.

A shared understanding of sustainability is imperative and must be part of our decision-making process. If given a choice, we must always choose the sustainable option.

SUSTAINABILITY WITH PURPOSE

I've said in previous columns that we must ensure our Soldiers are never in a fair fight. Sustainability is a key tool in our toolkit to protect and serve our Soldiers.

For example, we can continue to increase power density in our storage batteries. But if we can also make our systems use less energy and become more efficient, it helps to reduce the Soldier's load and extends the operational envelope. Finding ways to be more energy efficient can also result in returning money to the budget for a Soldier's kit. But we can't do this alone.

My top priority is always the Soldier. That is why, as the Army Director of Acquisition Career Management, I want to ensure all Army Acquisition Workforce professionals have information and training available regarding environmental sustainability and climate resilience so that we are doing our collective part. It's important to understand that each of us has a role to play and an impact to make. From sourcing efficient capabilities that work well together and are themselves sustainably sourced, to leveraging materials that don't create long-term negative environmental impacts, from efficiently utilizing operational energy to reduce demand on our systems, to recycling or upcycling used materials, every little thing we can do makes a difference.

We can set the baseline through upskilling.

UPSKILLING

In 2023, we focused additional training on digital transformation; 2024 is the year of sustainability.

As with digital transformation and digital literacy, our workforce must have fundamental literacy regarding sustainability.

TAKING FLIGHT

A B-52 assigned to the 2nd Bomb Wing at Barksdale Air Force Base, Louisiana, takes off from Andersen Air Force Base in Guam, in support of a Bomber Task Force mission in April 2023. (Photo by Airman 1st Class William Pugh, Pacific Air Forces)

> "I speak for the trees, for the trees have no tongues."
>
> ***—Dr. Seuss, The Lorax***

We must be able to have intelligent conversations about sustainability and articulate its benefits as part of our configuration management process. This shared understanding will help drive change, innovation and new ways of thinking.

CONCLUSION

The B-52—expected to remain in use beyond 2040 in the U.S.—remains a pinnacle of durability and flexibility in aviation and in the defense acquisition community. The U.S. still has more than 70 of these aircraft in its inventory, with 60 in use by both active and reserve units. The plane itself remains structurally sound while its avionics, flight hardware, and weapons and navigation systems have been upgraded over time. What's made it successful is not just the original out-of-the-box thinking of its designers, but a commitment to ensuring its longevity in the inventory through the continuous incorporation of cutting-edge technology.

We must maintain the innovation mindset of the B-52 for our Army programs.

As part of the Back-to-Basics transition, we're now placing greater emphasis on targeted learning and self-development that are driven by supervisors and employees themselves. I encourage you to take our recommended Udemy training, educate yourself, do the reading, put in the work and ultimately contribute to our ever-evolving mission, supporting our Soldiers, the Army, the nation and our planet.

A CLIMATE INFORMED WORKFORCE

Courses, such as "Integrating Sustainable Acquisition" and "Climate Adaption for Program Managers," offered through the Defense Acquisition University, aim to ensure the acquisition workforce has the knowledge and tools to mitigate environmental challenges. (Photo by Mizuno K, Pexels)

ADVANCING CLIMATE LITERACY

From workforce education to continuous improvement to innovation, these best practices underscore the Army's commitment to reducing environmental impacts.

by Ashley M. Kestner

The U.S. Army perpetually navigates the dynamic intersection of military acquisition and environmental sustainability. Juggling these constantly evolving operational demands and environmental impacts is no minor task, but the Army is up for the challenge.

In alignment with President Biden's 2021 executive order and the Army's 2022 Climate Strategy, Army sustainability efforts are gaining momentum. This is especially critical within the Army Acquisition Workforce (AAW), where three fundamental factors are converging to propel military readiness and environmental responsibility.

FACTOR ONE: CLIMATE-INFORMED WORKFORCE

Recognizing the importance of climate literacy, the Army is looking to integrate climate considerations into its training to enhance workforce proficiency in climate-related matters. The Army acquisition community is leaning forward in this effort.

The first course, Integrating Sustainable Acquisition (FAC 038; three hours, two continuous learning points (CLPs)), provides crucial insights into sustainability and climate risk management considerations for acquisition. The content aims to advance procuring products and services aligned with federal sustainable purchasing requirements. Moreover, it explains the importance of mitigating the impacts of physical climate risks on the delivery of products and services to the federal government.

The second course, Climate Adaptation for Program Managers (FAC 095; one and a half hours, one CLP), offers high-level background information on climate risk, authoritative sources, and emphasizes the necessity of climate adaptation in procurement. The content includes illustrative examples of risk management strategies. It also outlines the impacts of climate change on the international supply chain, potential cost escalations, effects on commodity availability, risks to overseas operations and more.

These continued improvements will help fuel defense sustainability goals, enhancing environmental responsibility in the near and long term.

These and other sustainability courses collectively embody the Army's ongoing commitment to a climate-informed workforce, ensuring employees have the knowledge and tools they need to mitigate environmental challenges.

FACTOR TWO: CONTINUOUS IMPROVEMENT

In compliance with the fiscal year 2022 National Defense Authorization Act, the Army must provide ongoing assessment of the knowledge, tools and capabilities necessary for the acquisition workforce to seamlessly integrate ecological considerations into acquisition processes, resource allocation and decision-making.

Further, recent findings from a RAND Corp. study underscore the pivotal role of the defense acquisition workforce in incorporating environmental considerations into planning and systems design. The study acknowledges the existing environmental expertise within the acquisition workforce but recommends areas for continuous improvement. According to the Director of Sustainability and Acquisition for the Office of the Deputy Assistant Secretary of Defense for Environment and Energy Resilience, DOD is reviewing the study and its suggestions and remains committed to expanding upon the sustainability resources and guidance available to the DOD workforce, including those in

DOD SUSTAINABILITY PLAN
The 2022 DOD Sustainability Plan outlines strategies for improving long-term sustainability, increasing energy efficiency and improving environmental impacts. (Image by DOD)

MAINTAINING SUPPLY
The Army Climate Strategy aims at establishing a road map for building resilient supply chains while also achieving net-zero greenhouse gas emissions by 2050. (Photo by Cottonbro Studio, Pexels)

acquisition. These continued improvements will help fuel defense sustainability goals, enhancing environmental responsibility in the near and long term.

FACTOR THREE: INTEGRATE SUSTAINABILITY, EMBRACE INNOVATION

The Army is taking a proactive leadership role in addressing environmental concerns. Aligned with the Army's broader goals for climate change risk analysis and the ambitious target of achieving net-zero greenhouse gas emissions by 2050, the Army Climate Strategy charts a clear road map for establishing resilient supply chains and more.

Acquisition and logistics is the second line of effort within this strategy, positioning the AAW as pivotal to achieving the Army's sustainability goals. The intersection of cost-effectiveness and environmental impact is evident throughout this approach. For example, the implementation of a Buy Clean policy for procuring construction materials and the Army's commitment to tactical innovation like vehicle electrification and autonomous resupply.

Other acquisition considerations include efforts to reduce fossil fuel consumption by integrating electric tactical vehicles, anticipatory logistics enabling predictive maintenance and supply chain efficiencies, and focusing on overall energy efficiency—including generators with microgrids, water reuse capability and LED lighting.

These courses collectively embody the Army's ongoing commitment to a climate-informed workforce.

CONCLUSION

These and other best practices underscore the Army's unwavering commitment to innovation and the adoption of new technologies designed to reduce environmental impacts. The AAW stands ready to contribute to a sustainable and environmentally responsible defense infrastructure. Together, we will champion sustainability, underscore our commitment to workforce literacy, and exemplify leadership through tangible action. In doing so, we meet the challenges of the present and actively shape a greener, more resilient future.

For more information on sustainability best practices and resources across the federal government, go to ***https://www.sustainability.gov****.*

ASHLEY M. KESTNER is the Acquisition Career Management Advocate program manager and a communications analyst for the U.S. Army Director of Acquisition Career Management (DACM) Office. She has more than 15 years of experience leading strategic communication, media relations, crisis communication, stakeholder management and brand advancement initiatives. She holds a B.A. in journalism from Indiana University.

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LILIAN RODRIGUEZ

COMMAND/ORGANIZATION: U.S. Army Contracting Command – Redstone Arsenal (Colorado Springs Branch), Space, Missile Defense & Special Programs Directorate, Space Innovations Branch

TITLE: Contract specialist

YEARS OF SERVICE IN WORKFORCE: 6

YEARS OF MILITARY SERVICE: 11

DAWIA CERTIFICATION: DOD contracting professional

EDUCATION: MBA, Webster University; M.S. in procurement and acquisitions, Webster University; B.S. in management, Park University

MASTER GUNNER, TRAINER, YOGI

Yogis teach their hatha members to set goals, find balance and push their limits. Instructors coach their students on the same. Acquisition professionals demonstrate these tenets to be just as critical in the field. Fortunately for the Army acquisition enterprise, Lilian Rodriguez has mastered all three roles of teacher, professional and instructor.

If one were to ask her what her job is, Rodriguez would simply reply, "I am a business adviser for the government." Although technically correct, business adviser does not capture the breadth and depth of what she is responsible for providing to mission partners and the acquisition community.

Rodriguez is a contract specialist within the Space Innovations Branch for Army Contracting Command – Redstone Arsenal, the Colorado Springs branch at Peterson Space Force Base. Though she cannot talk about specific missions there, her work continues to support our warfighter as she has throughout her career.

She recently departed Mission and Installation Contracting Command (MICC) – Fort Carson, Colorado, where she was a contracting officer with a substantial workload. In addition to supporting Army contracts, she trained nearly a dozen contracting interns, mentored countless others and was a leader of a local yoga group.

"Leaving Fort Carson was very hard, it's where I started my contracting career. I learned everything I know there. But then it started to feel 'safe,' and I wanted to challenge myself and see and do other types of contracts," she said. "It was time to start a new adventure and meet more wonderful people."

"Get yourself into a battle rhythm, from there it's all just a dance."

Before joining MICC in 2017, Rodriguez served more than 10 years in uniform as a supply sergeant in the U.S. Army. In that role she was stationed at Fort Bliss, Texas, Iraq and Germany. Following active-duty service, she cultivated experience in the civilian sector as a logistics management specialist, financial services representative and a sales manager.

Rodriguez said she was drawn to the Army Acquisition Workforce for two reasons. First, the tangible impact the organization has on the warfighter and their mission. "Being involved from the first step of identifying a need to the final on-ground reality of receiving that unique, contracted solution provides a professionally rewarding experience," she said, and she can see her efforts come to fruition to benefit our mission partners.

YOGI FOR LIFE

Lilian Rodriguez sits on a yoga mat during a retreat to Mexico last year. She has a passion for yoga practice and brings teachings into her professional life as well. (Photo courtesy of Lilian Rodriguez)

"I write contracts for the U.S government. We buy supplies and services for the warfighter. My support can make or break a mission," she said. "As a former Soldier, I know how important it is to have the comfort items and the necessary items to complete a mission. I enjoy seeing a project from beginning to end and knowing that I made a difference."

Second, acquisition offers countless opportunities for advancement.

"You are in charge of your destiny. It's up to you how fast you can progress in this field. If you're willing to go above and beyond, the opportunities are there," Rodriguez said.

That isn't a sweeping generalization, either. In her time at MICC-Fort Carson, she started as a purchasing agent, and in under five years was a warranted (appointed) contracting officer responsible for a $6.5 million warrant. She accomplished this by seizing moments of growth and maintaining a tenacity for learning. Specifically, she was granted her warrant after participating in the inaugural Master Gunner course in 2022. The intense course was designed to provide rigorous contract training to Soldiers and civilians and included both written tests and a four-event culminating competition. Rodriguez placed second and received numerous accolades in addition to her warrant.

"Attending the MICC Master Gunners course absolutely transformed my view on the acquisition field, it made me a better leader, it simplified the bigger picture for me," she said.

After establishing herself at Master Gunner, she returned to MICC-Fort Carson to take over as a team lead within the Installation Division, where she not only took on the bulk of contracting officer work but was also tasked with training an entire division of interns. Using lessons learned from her time in service, time in industry, the teachings of yoga and the Master Gunner crucible, she took almost a dozen interns under her wing. Executing contracts and training neophytes can be full-time responsibilities independent of one another, but even more daunting when combined. However, Rodriguez excelled.

"Get yourself into a battle rhythm, from there it's all just a dance," she said. "I've truly enjoyed being a KO [contract officer] and team leader. Helping new contracting professionals learn and understand our career field is a rewarding process."

Before departing Fort Carson for her current role at Peterson Space Force Base, she left the organization with a final lesson from yoga: "Inhale the future, exhale the past."

Rodriguez's passion for her yoga practice is evident, as is its applicability to her professional life. "I am the yogi and runner in my group of friends. Yoga teaches you to be calm and to center yourself, running requires discipline," she said. "I use those techniques at work. It makes me a happier, better person to work with."

—MAJ. BRAD HEINLEY AND HOLLY DECARLO-WHITE

CAREER NAVIGATOR

TEAM AWARD
Army Contracting Command – Redstone Arsenal (ACC-RSA) Executive Director Joseph A. Giunta Jr., front row center, poses with his team at the Army Acquisition Executive's Excellence in Leadership Award ceremony at the Pentagon on Jan. 9, 2024. The ACC-RSA team, led by Giunta, took home two categories during the annual acquisition awards event. (Photo by Henry Villarama, Office of the Chief of Public Affairs)

RED LIGHT, GREEN LIGHT DAYS

A look at one Army acquisition leader's efforts to recruit and retain an engaged workforce.

by Brianna Clay

What's the key to building an engaged workforce?

According to the executive director of the Army's largest contracting command, it starts with fostering a workplace environment, whether physical or virtual, that creates "more green light than red light days."

Joseph A. Giunta Jr., executive director and senior contracting official at Army Contracting Command – Redstone Arsenal (ACC-RSA), refers to "red light days" as those mornings when employees dread going into the office. "You want to create an organizational atmosphere

where workers want to go into the office—where they don't drive to work hoping to hit every red light on the way just to delay the start of the workday," he said.

Giunta's job is to lead his command's workforce into the future and ensure mission success—and it's a future that looks very different following the COVID-19 pandemic. ACC-RSA is the largest contracting center, with over 900 contracting professionals. Roughly 100 of them operate remotely, Giunta said, and it's a trend leaders must embrace without being held hostage to a corporate or command climate of convenience.

Army AL&T magazine sat down with Giunta in November to discuss his approach to recruiting and retention in the post-pandemic environment.

AL&T: What nuances in trends are you seeing in the workplace environment and recruitment within the command?

GIUNTA: In my experience, historically, when recruiting someone from an outside location, candidates frequently asked for relocation incentives. Prior to COVID, that seemed to be the greatest challenge we faced in the recruiting process once we found the right person for the position. Fast-forward through COVID, and it's no longer about relocation incentives. Now, the question we get asked is, "Can this position be offered as remote?"

Of course, we can hire remotely if we authorize that as part of the hiring action, but we can't do everything remotely in our business. I don't believe remote work or 100% telework will ever replace the need to work closely and face-to-face with our mission partners, but it does offer us flexibility for recruiting and retention purposes. We've been able to move work around from a remote employee if we need to have someone who must engage in a more face-to-face exchange with our mission partners, but that's been an exception. Our remote employees are extremely valuable to us, but they represent a smaller portion of our larger workforce. The contracting workforce is a unique functional career field, and it takes a significant amount of on-the-job training and "hands on" experience to fully develop a contracting professional. To that end-state, we use remote positions to augment our workforce, and frankly, that can be a challenge in the post-COVID employment culture.

AL&T: As a civilian workforce, we're experiencing both interagency competition and private industry competition, and the post-pandemic environment has exacerbated those challenges. How has ACC-RSA faced those challenges?

GIUNTA: It might surprise you to know but we don't lose a lot of our contracting professionals to industry. Generally, we pick up more folks from industry than we lose, and there are various reasons for that. I believe government employment offers greater stability than industry, and I think the operational tempo is more consistent. Lastly, we have an awesome mission and supporting the Army and our Soldiers is very satisfying.

On the other hand, we do compete with other governmental organizations, whether it be DOD or other federal, state or local agencies who can offer the same stability with competitive pay. There are two major hubs for Army contracting or contracting professionals in the federal government: [Washington] D.C. and Redstone [Arsenal, Alabama]. It's getting more challenging in Redstone because other federal agencies have either moved here or have expanded and they have significant contracting workforce requirements. We are surrounded by competition: the FBI, NASA, the United States Army Corps of Engineers, the Defense Logistics Agency—even my higher headquarters, which is located across the street from my center. It's always good to have your folks go to your higher headquarters and expand their professional opportunities, but when they leave our organization, their departure creates a talent gap. The contracting career field is very volatile, highly competitive and desirable. It takes roughly 10 years to develop a truly capable, fully competent contracting professional, so our competition proactively recruits our best and brightest—what we call journeymen—because they are a highly sought-after asset. So, our challenge is more interagency, I guess you'd say, and I think that will always be the case.

AL&T: How do you mitigate those losses?

GIUNTA: The government uses a variety of pay and evaluation systems, and that's both a blessing and a challenge. A significant portion of the acquisition community is in the Army Acquisition Demonstration Project (AcqDemo) pay and evaluation system. My supervisors—at least in Huntsville—are in AcqDemo, but most of my employees are in DPMAP (DOD Performance Management and Appraisal Program). AcqDemo provides a great amount of flexibility to recruit and compensate high-performing employees. Most of my competition at Redstone utilizes AcqDemo or an equivalent system. That makes it extremely challenging to compete when recruiting critical positions. For example, it's hard to recruit and retain employees who work secure environment contracting, because they are required to operate in a SCIF (sensitive compartmented information facility), so I'm trying to transition part of that workforce into AcqDemo. I would love to put the entire workforce in AcqDemo, but there are funding

WORKFORCE CHECK-IN

ACC-RSA Executive Director Joseph A. Giunta Jr. addresses the workforce during a quarterly town hall at Redstone Arsenal, Alabama. The ACC-RSA workforce comprises more than 900 contracting and acquisition professionals. (Photo by Sarah Martinez, ACC-RSA)

challenges associated with the transition process. Using a different pay and evaluation system where it makes sense is one of the ways we try to mitigate attrition and enhance recruitment.

The other is putting programs and policies in place that incentivize the workforce to stay. For example, we have a shadow program. Not every organization allows their employees to shadow with the senior leader, so I use that as a retention and career-enhancement tool. I also have a policy called the "three-year rule," which allows any employee to request an internal rotation after three years, no questions asked. The only person who can deny a move is me, and I've not denied any. I've been here about five years, and we've had roughly 50 employees request to rotate. This policy allows an employee to take on new challenges without having to leave the center. Let's say it's an employee supporting our aviation programs, and they contract a certain way, normally sole-source contracts. This employee would like to work on the installation side and learn that part of Army contracting. Well, after three years in their current position, he or she can request a rotation. We always have vacancies, due to natural attrition, so they can move within the organization, grow professionally and enhance their resume.

There are valuable team members who work successfully within their strengths, and there are those who need to be challenged. These are the people who want to learn new skills and seek out new challenges. This offers them that opportunity, so they don't grow bored and start seeing red lights. I charge my supervisors to

know their employees and to create an environment where every employee wants to come to work every day so they can support the mission, grow personally and professionally all while interacting with their teammates. It is all about creating more green light than red light days.

AL&T: When it comes to opportunities, what do you think appeals to job seekers at different experience levels? How do you attract diverse groups?

GIUNTA: When I assumed this position, we were bringing in about 25 fellows a year. We've made a concentrated effort in the last two years to bring in at least 50, and there are a lot of reasons for that. The competition is taking our talent, so we've got to grow our own. If you grow your own talent in a green-light atmosphere, they begin to embrace your culture. If you like where you work and the people you work for, you tend to stay in that organization. It just makes sense.

We also do a demographic survey every year and I get to see just how diverse we are as an organization. I believe diversity is a strength when it brings different people with different ideas and experiences to the team. We lead the Army Contracting Command in many categories to include the number of women in leadership positions and the number of African Americans employed at all levels within the command, including senior levels of leadership. But we also have areas where we can improve. I'm sending my recruiting teams to schools we haven't visited in the past, such as universities in Oklahoma, which are likely to have a greater number of Native Americans within the student population, or to Puerto Rico to increase our access and exposure to the Hispanic population there.

We've spent a lot of time and effort to share with a more diverse audience our mission and our purpose so they can appreciate the value of contracting command in hopes they will understand that they can make a significant impact as part of our team. Certainly, we worked hard to support our nation during COVID, so we share that story so the younger generations can understand how they can serve our country as a Department of the Army civilian. You cannot watch the national news without hearing a reference to something that's in our portfolio. That shows how important our mission is to our Army and our nation.

I also host branch and division chief meetings monthly with my junior leaders. We talk about whatever is on their minds. I also do the same with all my nonsupervisory workforce quarterly. That is one way a senior leader can be open and accessible to his or her workforce, and it's a great way to hear what's going on across the command.

The contracting career field is very volatile, highly competitive and desirable.

AL&T: Lastly, the line between government employment and military service gets blurry in the public eye. As a civilian workforce, how can we distinguish ourselves in the job market?

GIUNTA: When you go to a college campus as part of a recruiting visit and put up a bunch of signs around your kiosk talking about the Army, there are people who may walk through that space and say, "I'm not going over there. I'm not joining the Army." As a result, they may never meet with my workforce who are there to recruit Department of the Army civilians. It's a tricky wicket. We've got to do a better job at educating the public on the outstanding opportunities that exist in serving as a Department of the Army civilian. Recently, one of my employees came up with a novel idea. Could we do a local commercial and talk about Department of the Army civilians working at ACC-RSA? That may be a bridge too far, but it's a great idea and it's out-of-the-box thinking. There are good ideas out there. Finding ways to tell our story is essential in recruiting the best and brightest talent in support of providing the best products and services to our Army.

This interview has been edited and condensed for clarity.

For more information on Army Contracting Command – Redstone Arsenal, go to ***https://acc.army.mil/contractingcenters/acc-rsa****.*

BRIANNA CLAY is an Army Public Affairs Fellow and public affairs specialist at the U.S. Army Acquisition Support Center. She holds an M.S. in international affairs from the Georgia Institute of Technology and a B.A. in international affairs from the University of North Georgia.

ON THE MOVE

ASSISTANT SECRETARY OF THE ARMY (ACQUISITION, LOGISTICS AND TECHNOLOGY)

1: NEW LEADERSHIP

Lt. Gen. Robert M. Collins, center, was appointed as the principal military deputy to the assistant secretary of the Army for acquisition, logistics and technology and director of the Army Acquisition Corps in January 2024 at the Pentagon. He previously served as the deputy for acquisition and systems management, where he provided executive oversight for the timely delivery of capability to Army and joint forces. At left is the **Honorable Douglas R. Bush,** assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)). (Photo by Henry Villarama, U.S. Army)

PROGRAM EXECUTIVE OFFICE FOR ENTERPRISE INFORMATION SYSTEMS

2: EIS WELCOMES NEW PEO

William "Bill" Hepworth, right, assumed the role of program executive officer (PEO), accepting the flag of the Program Executive Office for Enterprise Information Systems (EIS) from the **Honorable Douglas R. Bush**, assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)), center, during a change of charter ceremony Jan. 19, 2024, at the Pentagon. Hepworth assumed the role after serving as deputy to the former PEO, **Ross Guckert**, left, since December 2022. (Photo by Laura Edwards, PEO EIS Strategic Communication Directorate)

3: FORMER PEO HONORED AT RETIREMENT

Ross Guckert, right, who had served as the PEO for EIS since May 2020, was honored during a retirement ceremony Jan. 19, 2024, at the Pentagon. Guckert received the Distinguished Civilian Service Award from the **Honorable Douglas R. Bush**, ASA(ALT), in recognition of his 34-year career as an Army civilian. Guckert also received the Award for Outstanding Service in the Army Senior Executive Service, to which he was appointed in 2007. (Photo by Laura Edwards, PEO EIS Strategic Communication Directorate)

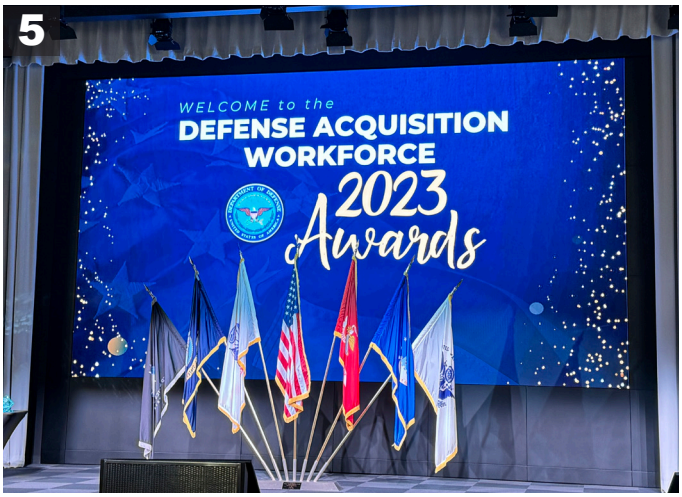
MISSION AND INSTALLATION CONTRACTING COMMAND

4: MICC PROMOTION

Maj. Gen. Douglas Lowrey was joined by his wife, Dena, and their three sons to pin on Lowrey's new rank during a promotion ceremony Feb. 2, 2024, at the Fort Sam Houston Theater on Joint Base San Antonio-Fort Sam Houston, Texas. Lowrey is the commanding general of the Mission and Installation Contracting Command. (Photo by Taylor Curry, 502nd Air Base Wing)

ACQUISITION WORKFORCE RECOGNITION

Editor's Note: We were unable to include all winners' photos in this section because of the sheer volume of distinguished honorees. Congratulations to all our Army acquisition teammates!



5: 2023 DEFENSE ACQUISITION WORKFORCE AWARDS

The 2023 Defense Acquisition Workforce Awards were held at the Defense Acquisition University Jan. 24, 2024, celebrating exceptional achievements of individuals and teams who have significantly contributed to the National Defense Strategy and upheld the secretary of defense's priorities through outstanding acquisition practices. **Radha Iyengar Plumb, Ph.D.**, undersecretary of defense for acquisition and sustainment, presided over the ceremony during which 49 individuals from the Air Force, Army, Navy, defense agencies and field activities were recognized for their critical roles in fostering innovation and modernization. (Photo by Angela Sanson, U.S. Army Acquisition Support Center)

Representing the Army among this year's distinguished honorees:

- **Anne Decker** from the Program Executive Office for Intelligence, Electronic Warfare and Sensors received the Individual Achievement Award for Auditing. Her transformative work in risk management internal control was instrumental in streamlining processes, reducing cycle times by 90%, mitigating manual error risks and advancing the Army's audit readiness and compliance.
- **ArmyIgnitED Team** from the Program Executive Office for Enterprise Information Systems received the Software Innovation Team Award for their "Federated Agile Approach." This approach, a partnership with the Air Force's Academic Education Management system, streamlined education assistance delivery, achieving $180 million in cost savings and efficiency enhancements.
- **Program Executive Office for Assembled Chemical Weapons Alternatives Team** from Aberdeen Proving Ground, Maryland, received the David Packard Excellence in Acquisition Team Award. The team's innovative approach to the safe and environmentally compliant destruction of chemical weapons has set a new standard for acquisition excellence.

2023 ARMY ACQUISITION HALL OF FAME

1: A LEADER HONORED

James "Jim" Shields was posthumously inducted into the Army Acquisition Hall of Fame in recognition of his exceptional leadership across the Army ammunition enterprise from 1983 to 2017. **Christine Shields,** widow of the honoree, accepted the award during the Army Acquisition Hall of Fame induction ceremony Oct. 9, 2023, in Washington. (Photos by ASA(ALT) Public Affairs)

2: SERVICE IN CONTRACTING

Jeffrey Parsons, center, accepted his award from Under Secretary of the Army **Gabe Camarillo**, left, and Assistant Secretary of the Army for Acquisition Logistics and Technology **Douglas R. Bush**, during the induction ceremony. Parsons was inducted in acknowledgment of his federal service from 1977 to 2011 and his pivotal contributions to the transformation of the Army Contracting Command.

2023 ARMY ACQUISITION EXECUTIVE'S EXCELLENCE IN LEADERSHIP AWARDS

Douglas R. Bush, assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)), hosted the Army Acquisition Executive's Excellence in Leadership Awards ceremony on Jan. 9, 2024, at the Pentagon, alongside **Lt. Gen. Robert M. Collins**, principal military deputy to the ASA(ALT) and director of the Army Acquisition Corps. The ceremony celebrated the work of numerous honorees who supported the delivery of cutting-edge capabilities critical to Army transformation.

3: 2023 Product Management/Product Director Office Team of the Year (O5 Level): **Foreign Military Sales, Poland Program Office, PEO Ground Combat Systems (GCS).** (Photo by Henry Villarama, U.S. Army)

4: Contracting Unit/Team of the Year: **U.S. Army Contracting Command (ACC) – Redstone Arsenal Team, Missiles and Space Directorate**. (Photo by Henry Villarama, U.S. Army)

5: Innovation in Contracting Strategies Individual or Organization: **Aviation & Missile Technology Consortium, Other Transaction Agreement Contracting Team**. (Photo by Henry Villarama, U.S. Army)

INDIVIDUAL HONOREES

Kelly Gorman, ACC-New Jersey, Acquisition Career Support Professional of the Year.

Rebecca Bowen, Office of the Deputy Assistant Secretary of the Army for Defense Exports and Cooperation, ASA(ALT), Defense Exportability and Cooperation Professional of the Year.

Ryan V. Lasecki, PEO GCS, Business Operations Professional of the Year.

Chia (Jeff) Lee, Joint PEO for Armaments & Ammunition (JPEO A&A), Logistician of the Year.

Chad D. Young, PEO GCS, Product Management/Product Director Office Professional of the Year (O5 Level).

Michael D. Sprang, PEO for Combat Support and Combat Service Support, Project Management/Project Director Office Professional of the Year (O6 Level).

Michelle Talbot, ACC-Rock Island, Illinois, Contracting Professional of the Year.

Thomas W. McKendry, ACC-Rock Island, Barbara C. Heald (Deployed Contracting Civilian) of the Year.

Stephanie Wilson, ACC-Rock Island, Outstanding Grants or Agreements Professional of the Year.

Jeffrey Wyant, Army Corps of Engineers, Omaha District, Construction Services Contracting Professional of the Year.

Jonathan Biffle, PEO for Missiles and Space, Test and Evaluation Professional of the Year.

Monica Griffin, PEO for Intelligence, Electronic Warfare and Sensors, Engineering and Technical Management Professional of the Year.

Tilghman Turner, Army Redstone Test Center, Army Test and Evaluation Command, Digital Transformation Professional of the Year.

Bryan R. Samson, ACC, Lifetime Achievement in Contracting.

TEAM HONOREES

Aviation & Missile Technology Consortium, Other Transaction Agreement Contracting Team, Innovation in Contracting Strategies Individual or Organization.

Foreign Military Sales, Poland Program Office, PEO GCS, Product Management/Product Director Office Team of the Year (O5 Level).

Project Director Towed Artillery Systems, JPEO A&A, Project Management/Project Director Office Team of the Year (O6 Level).

Army Operational Test Command, Air Missile Defense Test Directorate, Army Test and Evaluation Command, Test Organization of the Year.

ACC Redstone Arsenal Team, Missiles and Space Directorate, Contracting Unit/Team of the Year.

2023 MAJOR GENERAL HAROLD J. "HARRY" GREENE WRITING AWARDS

The Office of the Assistant Secretary of the Army (Acquisition, Logistics and Technology) sponsors the 2023 Major General Harold J. "Harry" Greene Awards for Acquisition Writing to encourage critical writing focused on Army acquisition challenges and successful efforts to overcome them.

To read the winners' entries, see the 2023 Maj. Gen. Greene awards booklet insert.

ACQUISITION REFORM

Alan Samuels, Ph.D., Jennifer W. Sekowski, Ph.D., and Brian B. Feeney, Ph.D., U.S. Army Combat Capabilities Development Command, for "Rethinking Acquisition from Left of Requirements: DEVCOM Chemical Biological Center's WILE-E (Warfighter Innovation Leveraging Expertise and Experimentation) Pilot Project."

Honorable Mention: **Joseph R. "Bo" Taylor III**, PEO for Missiles and Space, for "Cybersecurity in a Rapid Capabilities Environment."

FUTURE OPERATIONS

Lt. Col. Edwin L. Kolen, JPEO for Chemical, Biological, Radiological and Nuclear Defense (JPEO-CBRND), for "Playing 'Small Ball': How the Defense Department Will Win Against Future Known and Unknown Biological Hazards."

Honorable Mention: **Caitlyn Hall,** Army Aviation and Missile Command, for "Army Facilities Components System – A New Standard for Contingency Bases in Future Operations."

INNOVATION

Dr. Christopher G. Earnhart and Dr. Lana A. Hopkins, JPEO-CBRND, for "Technologically Advanced Response System to High Consequence Biological Threats."

Honorable Mention: **Bonnie Evangelista,** Office of the Secretary of Defense Chief Digital and Artificial Intelligence Office, for "Shop 'til You Drop: Introducing the Tradewinds Solutions Marketplace."

LESSONS LEARNED

Lt. Col. John M. Williams II, PEO for Simulation, Training and Instrumentation, for "Operationalizing Discovery: Lessons Learned from a DEVCOM Science Advisor."

Honorable Mention: **Robert H. Sullivan**, Army Tank-automotive and Armaments Command, for "Lessons Learned: The Need for Best Practices for Coding Diagnostics and Troubleshooting in Army Technical Publications."

OFFICE OF THE CHIEF OF STAFF ANNOUNCES ARMY GENERAL OFFICERS

Brig. Gen. David C. Phillips, program manager, Future Long Range Assault Aircraft, Program Executive Office for Aviation, Redstone Arsenal, Alabama.

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"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."

—The Hon. Douglas R. Bush
Army Acquisition Executive and
Assistant Secretary of the Army for Acquisition,
Logistics and Technology (ASA(ALT))

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