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ACQUISITION AT SPEED

OPERATIONALIZING INNOVATION
Lessons learned from Project Daedalus show how innovation is fostered by the Army Reserve

HOT AND COLD
Military vehicle testing requires exposure to extreme temperatures for accurate and reliable results

CREDIT WHERE IT'S DUE
Credentials help acquisition professionals tailor training and education to their careers

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To contact the Editorial Office: Call 703-664-5636/5633

Email: **armyalt@army.mil**

Mailing Address:
DEPARTMENT
OF THE ARMY
ARMY AL&T
9900 BELVOIR ROAD
FORT BELVOIR, VA
22060-5567

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By Order of the Secretary of the Army:

JAMES C. McCONVILLE
General, United States Army
Chief of Staff

Official:

MARK F. AVERILL
Administrative Assistant to the Secretary of the Army
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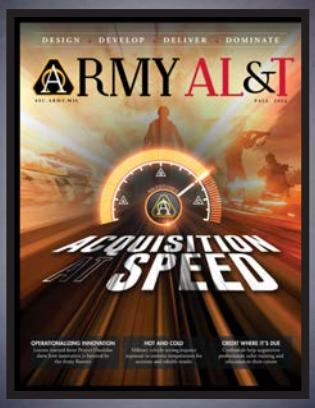

ON THE COVER

This issue is all about speed. From concept to award, from research to fielding, the Army is determined to make acquisition faster and deliver world-class solutions to its warfighters in the process.

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From the Editor-in-Chief

Speed is everything, it seems. Who can run the fastest, what is the quickest car, can we beat the speed of light (warp speed, anyone?), hypersonic weapons…the list goes on. Speed is how we stay ahead of the competition, near-peer competitors and win in battle. Like most things, Army acquisition is not immune to the "need for speed" either. Over the years, acquisition has struggled with exactly what kind of speed they wanted: speed in acquisition, acquisition speed, acquisition at the speed of technology, acquisition at the speed of relevance and now acquisition at speed.

Of all the permutations mentioned, "acquisition at speed" hits closest to the mark. Why? At speed simply means quickly—not at the pace of technology or relevance, or speed just for speed's sake, but as quickly as possible while doing required checks and tests to deliver the very best product possible to our Soldiers.

But what regulates acquisition speed, and what considerations need to be taken into account? As Brian Schultz, a professor of program management and an executive coach in DAU's Capital and Northeast Region at Fort Belvoir, Virginia, writes in his May 29, 2022 "Acquisition Speed Manifesto" in the Defense Acquisition Magazine blog, "Speed must be a key element of a program's strategy. Acquisition strategies determine priorities, incentives, risks and opportunities, business arrangements, pathways and other key factors. If going faster is the priority, then this overarching consideration should drive acquisition strategies."

Ahhh, but like the old acquisition joke about cost, schedule and performance—pick any two—anytime you prioritize one thing, speed for example, something else has to give. That is why Army Acquisition Executive Douglas R. Bush is focused on doing acquisition at speed—and right!

In this issue you will find multiple examples of program executive offices performing acquisition at speed, and delivering world class solutions to our warfighters in the process. For example, it all starts with defining requirements. To that end, read "Twenty-First Century Approach to Acquisition Drives Fighting Vehicle Process" on Page 32. The Optionally Manned Fighting Vehicle (OMFV) process is being sped up via the mid-tier acquisition pathway and digital engineering to avoid past practices such as providing overly prescriptive lists of specifications to companies in developing their proposals.

Email Nelson McCouch III
@ armyalt@army.mil

Adopting the best acquisition practices is also key to staying ahead of near-peer adversaries. Learn how the U.S. Army Communications-Electronics Command's Software Engineering Center is addressing one of the thorniest issues in acquisition—intellectual property—by using data escrow to shape more agile and modern sustainment strategies. That's in "Data Escrow is the New Black," on Page 24.

Finally, collaboration is everything, and the Program Executive Office (PEO) for Aviation is taking it to a new high. Discover how PEO Aviation's Combat Aviation Brigade Architecture Integration Lab is partnering with warfighters to co-develop systems and capabilities, enabling the warfighter to be equipped with operationally verified capabilities in an expedited manner faster, and at reduced costs.

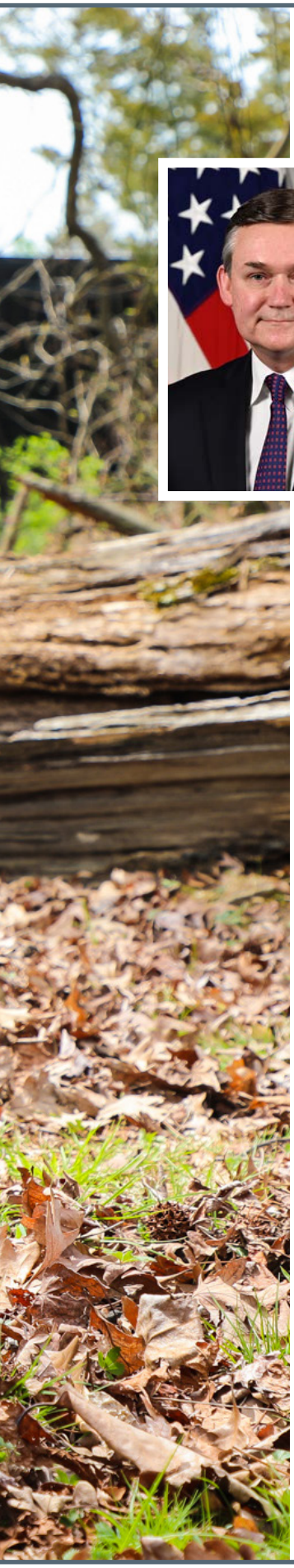
There's lots more in this issue highlighting the great work of the Army Acquisition Workforce such as: PEO Ground Vehicle Systems Center's initiative to grow future STEM experts by holding summer camps for Native and Indigenous communities in the Michigan area (Page 106); efforts to build better bunkers (Page 82); and modernization plans for Army Ammunition Plants (Page 100)—stuff that sometimes gets pushed to the back but is vital to the success of our Soldiers.

As always, if you have a concern, comment or, better yet, a story idea you would like covered—or to write yourself—please contact us at **armyalt@army.mil**. We look forward to hearing from you.

Nelson McCouch III
Editor-in-Chief

NEW AMMO

The Army's replacement for its decades-old M249 squad automatic weapon is the new XM250 automatic weapon, which will also come with a new caliber of ammunition. The newness of the ammo means that the Army's organic industrial base will have to ramp up production to meet the Army's needs as it fields the weapon. (Photo courtesy of the Program Executive Office for Soldier)



ACCELERATED ACQUISITION

Speed is a winning strategy for the Army and America.

The United States Army faces rapid change, and Army acquisition must adapt rapidly to keep up. Advances in technology, rapidly shifting economic conditions, changing geopolitical alignments, and the effects of climate change are all impacting the Army's future. The People's Republic of China is our pacing challenge, but Russia's invasion of Ukraine and the persistent threats from North Korea, Iran and violent extremist organizations make it clear the Army must be prepared for a wide range of possible conflicts. In this context, I am confident that our six modernization priorities—Long Range Precision Fires, Next Generation Combat Vehicles, Future Vertical Lift, Network, Air and Missile Defense and Soldier Lethality—remain the right ones. The mission of Army acquisition is to deliver those capabilities on time to support the Army and the joint force.

Because of this environment, speed in acquisition is my first priority. We must always remember that delivering capable equipment to the warfighter at speed is our No. 1 mission. It is an enormous responsibility. The acquisition programs of today will be the weapons that warfighters—both our own and those of our allies—will rely upon in combat five to 10 years from now, or sooner.

However, the traditional defense acquisition system wasn't set up for speed. To overcome that, we are now seeing how a combination of new authorities from Congress, innovative contracting, high-fidelity prototypes and expanded Soldier feedback are allowing the Army to move quickly while also ensuring that systems are properly designed, fully tested and sustainable over time. Continued use of this approach into the future will be critical to our success.

RAPID ARRIVAL
Mobile Protected Firepower transitioned to a major capability acquisition program in June—crucial feedback from Soldier touch points allowed the program to enter production in under four years. (Photo courtesy of the Office of the Secretary of the Army)

DEMONSTRABLE SUCCESS

But before discussing the future, we should look to the recent past for inspiration. Army acquisition led the federal government's efforts to respond to the COVID-19 pandemic. Army contracting and acquisition professionals worked tirelessly throughout the pandemic to ensure vaccines, treatments and other supplies were rapidly available across America. Their innovation and hard work saved millions of lives, both here and abroad. More recently, the conflict in Ukraine has highlighted the effectiveness of Army weapons such as Stingers and Javelin missiles, M142 High Mobility Artillery Rocket System (HIMARS), M777 howitzers, advanced 155 mm ammunition and guided Multiple Launch Rocket Systems rockets, just to name a few.

We must always remember that delivering capable equipment to **the warfighter at speed** is our No. 1 mission.

Those success stories in Ukraine didn't just happen. They represent the work of Army acquisition professionals over many years. Many of those who helped respond to the pandemic and develop the weapons being used in Ukraine are still part of our community. We should all be proud of their work and the results we are seeing here at home and on the battlefield. They show that Army acquisition can get the job done.

24 BY '23

Building on this past success, we are now seeing encouraging results across the Army's modernization efforts. By the end of the 2023 fiscal year, we anticipate having 24 new systems in the hands of Soldiers, including the Long Range Hypersonic Weapon, improved elements of the Integrated Tactical Network,

A DIFFERENT CALIBER

The new XM5 rifle and XM250 automatic rifle, which will eventually replace the M4 carbine and the M249 Squad Automatic Weapon, respectively, will use the 6.8 mm common cartridge family of ammunition. The Army announced in April that the mid-tier, rapid-fielding effort led to its selection of Sig Sauer, a firearms company, as the manufacturer to provide the new weaponry. (Photos courtesy of Sig Sauer)

new combat vehicles, new small arms and an array of other systems. Let me highlight just a few of the many examples of our recent progress.

In June, the Army successfully completed the Mobile Protected Firepower middle-tier acquisition rapid-prototyping phase and transitioned it to a major capability acquisition program with a favorable milestone C decision. With crucial feedback from Soldier touch points, the program entered production in just under four years. Normally, a program of this size and scope would have taken between six and seven years to go from prototype to production. While much work remains to be done, it is my hope that Mobile Protected Firepower is recognized in the future as a model for how the acquisition and requirements communities work together to enable program success.

In July, the Army released the request for proposals for the Optionally Manned Fighting Vehicle (OMFV) detailed design and prototype build and test phases, phases three and four of the five-phase program. With a focus on innovation, competition and production of a transformational infantry fighting vehicle, OMFV will be the first ground-combat vehicle designed using digital engineering. Additionally, the use of modular open-system architecture will allow for rapid integration and insertion of future technologies.

In another major advancement, the Next Generation Squad Weapon (NGSW) completed rapid prototyping and entered rapid fielding in April, after a 27-month prototyping and evaluation effort with numerous technical tests and Soldier touch points. The NGSW includes the XM5 rifle to replace the M4/M4A1 carbine and the XM250 automatic rifle to replace the M249 squad automatic weapon. Both new weapons for the close combat force are lightweight, paired with the XM157 fire control for increased accuracy and lethality, and fire 6.8 mm ammunition.

And finally, we anticipate the upcoming award of the development contract for the Future Long Range Assault Aircraft. This aircraft will, over time, replace the Army's highly successful UH-60 Black Hawk helicopter and provide the Army with unprecedented speed and range for Army aviation.

CONCLUSION

These success stories didn't happen because of Army acquisition alone. We need creativity and innovation from industry and entrepreneurs working with the Army's research-and-development community and our acquisition professionals to ensure America's Army remains the best equipped in the world. We also need our defense industry partners to continue to deliver on time and on budget. I am confident that we will succeed because American workers are the best in the world and American innovation is second to none.

Finally, we need our Army partners to ensure the Army succeeds. Army acquisition, Army Futures Command, Army Materiel Command, the Army staff and many others must work together to bring all the aspects of modernization together. Working together at speed, we can ensure that our joint warfighters are ready to deter adversaries and, if necessary, face any challenge on the battlefield today and in the future.

WATER POWER

Army Water Purification Training Division and North Carolina State University students evaluate opportunities for additive manufacturing parts for the 30-year-old, 3,000-gallon reverse osmosis water purification unit. Roger Tutton, left, an inspector, chats with students Brian Scott, Julie Talbot, Matthew Clayton, and Reverse Osmosis Water Purification Unit (ROWPU) maintenance management supervisor James Walker. (Photos courtesy of Office of the Chief of Army Reserve)

OPERATIONALIZING INNOVATION
IN THE U.S. ARMY RESERVE

Lessons learned from Project Daedalus, a mobile app for the Army Reserve, show how innovation can be fostered by Reserve Soldiers—and the obstacles that confront them.

by Col. Conrad J. Jakubow, Maj. Wonny K. Kim, Maj. Vikram Mittal, Ph.D., and Maj. Clay D. Murray Jr.

In January, a group of undergraduate computer science students started a Hacking for Defense (H4D) course at Columbia University. Administered by the National Security Innovation Network (NSIN), this course would attempt to meet a challenge nominated by the U.S. Army Reserve (USAR) to develop a full-stack mobile app to address safety requirements at USAR facilities.

The student team was joined by Army Reserve Soldiers from the 75th Innovation Command, who served as a project manager and expert advisors. Drawing parallels to the byzantine labyrinth that is Army procurement, the team christened the effort Project Daedalus after the mythical Greek figure who successfully escaped Crete. Determined to not fall into the ocean like Daedalus' son, Icarus, the team collaborated to bridge the "Valley of Death" and successfully deliver new capability into the hands of Soldiers and DOD personnel.

Sixteen weeks later, the students produced a fully functional front-end mobile app and back-end web interface. The underlying codebase was licensed as open-source software (OSS) and a copy was delivered to Training and Doctrine Command-Mobile (TRADOC-Mobile). Among other duties, TRADOC-Mobile conducts cybersecurity vetting of externally developed mobile applications for the Army Deputy Chief of Staff, G-6's approval and acceptance as official Army apps.

PROJECT DAEDALUS
The Hacking for Defense (H4D) team takes a break after submitting codebase and artifacts to TRADOC-Mobile for Project Daedalus on May 4. The H4D team, from left, is Bora Elci, Jorge Mederos, Kerim Kurttepeli and David Cendejas joined by co-author Maj. Wonny Kim. Not pictured are Capt. Khalil Jackson and Chief Warrant Officer 3 John Waldie.

Matthew Maclaughlin, chief of that division said, "I'm impressed with the quality and professionalism of the code delivered to us in support of this Army mission."

Not only did Project Daedalus deliver an app, but it also fostered positive perceptions of DOD with academia and future technologists. The student developer team, Bora Elci, David Cendejas, Jorge Mederos and Kerim Kurttepeli, with academic supervision by Paul Blaer, Ph.D., were ecstatic that the Army would be using and publishing a derivative of their work. The students said that working alongside members of DOD was a fulfilling experience for them both professionally and personally. The unique design problems challenged them to think creatively, and not only helped their academic work, but also better prepared them for professional work as well.

INNOVATE HOW?

While this is a story of triumph, many efforts to innovate in the Army Reserve unfortunately end like Icarus rather than like Daedalus's escape. This is a true tragedy, given that key technologies in the hands of motivated, trained and inspired Soldiers provide our warfighters with the edge necessary to fight and achieve success on the battlefield. While the Army Reserve plays crucial, combat-enabling roles in conflicts (e.g., port operations, obstacle clearance), it faces significant structural challenges to innovate given that:

1. It does not have a designated research, development, test and evaluation (RDT&E) budget.
2. Army Reserve Soldiers are expected to maintain combat readiness with only 40 training days per year while often geographically dispersed and with generationally older equipment.
3. Army Reserve Soldiers have civilian careers that they must balance with their military professions.

However, these challenges also create an opportunity for the U.S. Army Reserve to foster innovation because of the breadth of civilian-acquired skills available through the force. In the case of Project Daedalus, a consultant, a chief information security

officer (CISO) from a Federal Reserve Bank and a senior developer serving the U.S. Special Operations Command—all of them Army Reserve Soldiers from the 75th Innovation Command—leaned in to support the student team project.

FUNDING CHALLENGES

In addition to providing technical guidance and problem-solving support to the student team, the Soldiers learned key lessons while navigating the common pitfalls for Army Reserve innovation efforts tied to the lack of RDT&E funds (e.g., Antideficiency Act violations) and general challenges for transitioning technology (e.g., lack of enduring sponsorship and programmed funding, intellectual property licensing).

A particularly challenging obstacle was DOD's governance model for software development. Despite the students publishing the app as open source software, there was reluctance to approve use of operations-and-maintenance funds to operate the application. Legal concerns centered on whether development was "complete" and if the codebase would be used "as-is" to justify operations-and-maintenance funding from the Army Reserve. This is emblematic of a governance model tailored to a "waterfall," or linear sequential, development process. One does not have to look further than DOD major acquisition programs to understand what waterfall efforts look like.

While the new Army Adaptive Acquisition Framework's software acquisition pathway is focused on custom military-unique software development needs, the DOD currently procures commercial off-the-shelf software using the same framework as a multibillion dollar, 20-year lifecycle program. Per the waterfall model, the Army procures commercial software once all development is complete and

The team collaborated to bridge the "Valley of Death" and successfully deliver new capability into the hands of Soldiers and DOD personnel.

using operations-and-maintenance funds. Though operations-and-maintenance funding can be used after development to support minor improvements that do not provide significant additional functionality (i.e., patching), RDT&E funds are necessary for any development beyond the original functionality. Under current guidance, while there is room for interpretation as to what qualifies for "significant additional functionality," there is a preference to use RDT&E funds when there is any doubt.

ITERATIVE IS HARD IN DOD

While waterfall development models are not without merit, there is no consideration in current DOD governance for modern agile development processes that emphasize continuous integration and continuous deployment. In the continuous model, which is ideal for projects that are driven by an engaged developer team with frequent customer interaction, development is never "complete" and new builds and updates are continuously deployed based on customer feedback. Software, which has developmental costs that may be measured in the thousands, or even as little as hundreds, of dollars with a life cycle measured in weeks, is currently held to the same standards as a major acquisition program that is billions of dollars and decades in the making.

Not only may this be a policy gap on iterative software development, it is also a challenge given how the DOD programs funding. The annual DOD budget cycle is generally not receptive to line items without defined milestones, and reprogramming RDT&E within program-objective memorandum cycles is a painstaking process. These policy and programmatic challenges may have very real effects on the Army's ability to innovate and achieve operational agility.

During the early months of its invasion of Ukraine, Russia attempted to jam internet service to more than 30 countries provided by satellite-broadband provider Starlink. A Breaking Defense article from April recounted the impression that the satellite-broadband company Starlink's ability to rapidly patch its critical software made on a senior defense official. " 'From an [electronic warfare] technologist perspective, that is fantastic. That paradigm and how they did that is kind of eyewatering to me,' said Dave Tremper, director of electronic warfare for the Pentagon's acquisition office. 'The way that Starlink was able to upgrade when a threat showed up, we need to be able to have that ability. We have to be able to change our electromagnetic posture, to be able to change very dynamically what we're trying to do without losing capability along the way.' "

Never mind that DOD would currently require the foresight to allocate and program funding two years in advance

FOCUS ON FEEDBACK
ROWPU maintenance technicians describe commonly broken parts to Julie Talbot, William Quimbayoglen, chief of the Army Water Training Division, Brian Scott, Matthew Clayton, James Walker and Roger Tutton, ROWPU inspector.

with the right office to address a dynamic 24-hour operational requirement to achieve the agility described by Tremper, the lack of RDT&E funds precludes the Army Reserve from innovating on today's problems.

Project Daedalus maneuvered around these constraints because the H4D program provided access and because the students covered associated development costs through an academic grant and offered the codebase for free as open source software. This was viable because of the relatively low non-labor costs (around $200) for development and the students' willingness to share the intellectual property (IP) of their own volition. Given that H4D and the U.S. government generally do not force the private sector to relinquish IP, the Army should not expect a wave of altruistic technologists offering IP for free as a viable model for projects with higher development costs.

ITERATE THE MODEL

This may be, however, an effective way to deliver minimum viable products to test and iterate on innovative solutions to Army problems. Bora Elci, from the student team said, "Using Agile, we were able to deliver quickly and found ourselves running beta tests around week eight. Initially it seemed impossible to accomplish this in parallel with our classes at Columbia, but we were able to deliver a full-stack app with a mobile frontend. Our weekly meetings with [Army Reserve] team members were crucial for this success as they enabled dynamic decision-making as we uncovered new challenges."

Project Daedalus served as a pathfinding effort on behalf of the Army Reserve on what could be done to operationalize innovation in partnership with academia. To that end, the Office of the Chief of Army Reserve (OCAR) is beginning to operationalize innovation across its component by:

1. Developing a central repository for all proposals for innovation, sourced from across the Army Reserve.
2. Curating a portfolio of ways and means to execute vetted and approved proposals.

The lack of RDT&E funds precludes the Army Reserve from innovating on today's problems.

3. Establishing a regular battle rhythm to direct the innovation efforts and share lessons learned across the force.

These efforts are modeled after not only the Army doctrinal operations process, but the innovation process that follows three generally accepted phases: invention, incubation and implementation.

CONCLUSION

Even with set processes in place for operationalizing innovation, the Army Reserve is still challenged by the lack of laboratories and development centers available for solving active-duty challenges funded through RDT&E funds. However, there has been a historic connection between the Army Reserve and academia, given the large number of Army Reserve Soldiers in undergraduate and graduate programs. Programs such as H4D serve as an excellent opportunity for the Army Reserve to leverage research expertise and harness innovation from academia given its constraints. Indeed, at any given time, the Army Reserve is connected to dozens of H4D efforts. Although some of these projects fail like Icarus, some soar like Daedalus.

The Army Operating Concept 2020-2040 defines innovation as conversion of new ideas into valued outcomes. To innovate for the future force, the Army should encourage efforts such as Project Daedalus that not only advance solutions development for tactical problems, but also highlight needs to modernize the Army's governance and resourcing for technology development.

In May 2021, Lt. Gen. Jody Daniels, chief of Army Reserve, said that "the Army Reserve is bringing innovation and depth to Army modernization efforts, with Army Reserve talent serving as an integral part of that effort." Despite unique challenges the Army Reserve continues to advance toward operationalizing innovation through sustainable processes and partnerships with academia. While continually learning and improving internally, the Army Reserve welcomes changes to policy or resourcing practices so that agile innovation success stories transcend myth and become a matter of routine.

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

COL. CONRAD J. JAKUBOW is the director of Strategy, Plans, Policy, and Prioritization, G-3/5/7, Office of the Chief of the Army Reserve. His career spans tactical and strategic echelons, and includes a deployment to Afghanistan as a civil affairs officer with Army Special Operations Command and as a Congressional fellow for the late Congressman C.W. Bill Young (R-Fla.). He holds a master's in legislative affairs from George Washington University, along with an M.A. in international relations and an MBA from Webster University, and a B.S. in geography from the United States Military Academy at West Point.

MAJ. WONNY K. KIM is an innovation and information operations officer in the U.S. Army Reserve 75th Innovation Command and has served at various echelons in Europe, Africa and the Middle East. He holds an M.A. in international affairs from Columbia University, a Master of Science and Technology Intelligence from National Intelligence University and a B.A. in philosophy and psychology from Binghamton University.

MAJ. VIKRAM MITTAL, Ph.D. is an acquisition officer in the U.S. Army Reserve 75th Innovation Command. He was previously in the Massachusetts Army National Guard, with which he deployed to Afghanistan in 2011. As a civilian, he is an associate professor in the Department of Systems Engineering at the United States Military Academy at West Point. He holds a doctorate in mechanical engineering from Massachusetts Institute of Technology, an M.S. in aerospace from the University of Oxford and a B.S. in aeronautics from the California Institute of Technology.

MAJ. CLAY D. MURRAY JR. is a strategist at the 9th Mission Support Command, Fort Shafter, Hawaii. He was previously a strategist at the Office of the Chief of the Army Reserve, including HQDA where he served as the strategic planner for the Army Campaign Plan 2019, 2021 and 2022. His previous assignments include serving as a military intelligence officer across various echelons in the Army, including tours at Defense Intelligence Agency and in Iraq. He holds an M.A. in intelligence studies from American Military University and a B.S. in political science from the University of Louisville where he was a Reserve Officers' Training Corps distinguished military graduate. He is a graduate of the Basic Strategic Art Program at the Army War College, and a member of the Army Strategist Association.

RELEVANT CARE

A Soldier supplies medical care during the USAMRDC Soldier and Noncommissioned Officer of the Year competition, held in March in San Antonio. ORA's goal is to advance military-relevant products, including those used in battlefield medical care, to the warfighter through flexible and innovative regulatory pathways. (Photo by Dr. Steven Galvan, U.S. Army Institute of Surgical Research)

NOT-SO-SECRET WEAPON

USAMRDC's Office of Regulatory Affairs facilitates the development of future medical materiel by making sure that all of the i's are dotted and the t's are crossed.

by Ramin A. Khalili

You don't need a crystal ball to get a peek at the future of warfighter medical solutions. Instead, just talk with Cyndi Donovan of the U.S. Army Medical Research and Development Command (USAMRDC) Office of Regulatory Affairs (ORA). Donovan is a clinical research associate in the office, and watches from the ground level as command industry partners develop and test new medical devices, drugs and biologics—all potential solutions for the modern Soldier. She and the rest of the ORA team are tasked with guiding those solutions from infancy to, ultimately, a mature, fully realized product for use in the battlefield. For that reason—and so many others—ORA has become an increasingly important player in the USAMRDC operation.

As part of a collaboration with USAMRDC's U.S. Army Medical Materiel Development Activity Force Health Protection division, Donovan is working with Kaléo, a Virginia-based pharmaceutical company contracted by DOD to develop a high-dose auto-injector for naloxone, which is an opioid agonist. That means that it stops or prevents the effects of opioid drugs. In a combat situation, powerful opioids could be aerosolized and deployed as a chemical weapon. A naloxone delivery system like Kaléo's auto-injector could be used on the battlefield to help mitigate opioid exposure and save warfighter lives. The product is already being used by special forces units and is positioned at various U.S. military installations across the globe for expedited distribution in case an imminent threat presents itself.

Donovan, who has been with ORA since 2009, is a former pediatric oncology nurse. She previously worked at high-profile universities such as Georgetown in Washington and Johns Hopkins in Maryland. However, there's something her current role offers that, as she put it, those other places just can't match. While Donovan said she can't know the person who is receiving the drug, product or tool individually, as she used to in nursing, "I do feel like I am part of a bigger piece of the puzzle that's saving someone's life," noting that Kaléo's auto-injector was scheduled to be commercially available by July.

REGULAR REGULATION

Saving lives is, indeed, one of ORA's broader goals—one that feeds into the command's overall mission and vision. As its name suggests, the Office of Regulatory Affairs is chiefly tasked with monitoring all regulatory affairs of USAMRDC and is responsible for all clinical, quality and internal regulatory efforts within the command to help advance promising military products to the warfighter. If that sounds like a lot of weight to carry, that's because it is. Their work is front and center, and provides more value and impact than most people realize. ORA is known for maintaining a sprawling infrastructure that touches just about every corner of the command, and sometimes beyond.

"A lot of business at MRDC—things like getting regulated products out to the warfighter, for example—wouldn't happen if ORA wasn't here," said ORA director Lisa Borek as she described a sort of brass-tacks breakdown of the organization's impact. "A lot of people don't fully understand what we do and how we function as the centralized regulatory capability available to both USAMRDC and the DOD; and that's a shame because we're a pretty big group." That work, which boils down to providing the knowledge and regulatory guidance required to navigate the occasionally tricky regulatory affairs pathway, is critical to the mission of USAMRDC and, to a larger extent, DOD as well.

The process of helping usher a product down an oftentimes complex regulatory pathway, makes the organization an integral part of the overall research, development and acquisition effort. Normally, the development of medical products regulated by the U.S. Food and Drug Administration (FDA) follows rigorous approval paths to ensure safety and effectiveness. ORA's main function is to act as the facilitator between military medical research and the FDA. By acting as a navigator of sorts, ORA helps to develop regulatory strategies through those pathways, applying and interpreting FDA regulations and guidance for partner organizations.

TEAMWORK

Cyndi Donovan, center, poses with USAMMDA staffers during a site visit to Germany in 2020. (Photo courtesy of Cyndi Donovan)

MAKE IT HAPPEN

"We are everywhere," said ORA deputy director Maj. Victor Zottig. He described the organization's role as that of a facilitator between product developers and the FDA. "We deal with a very interesting and innovative space, and we have to come up with creative solutions to make sure those products pass FDA muster—but then also get to the warfighter as soon as possible."

ORA's portfolio includes more than 100 different and varied products across all stages of research and development (as the saying goes around the office, you never see the same thing twice, and it never gets boring). Currently, ORA is partnering with the U.S. Army Medical Materiel Development Activity (USAMMDA) Warfighter Brain Health project management office on proper protocols for a pair of adaptive clinical trials, along with a slew of vaccines and therapeutics to help combat everything from infectious diseases to traumatic brain injury and post-traumatic stress disorder. Since compliance efforts usually last the entire life cycle of a given product, it's common for ORA to provide oversight and regulatory consultation for anywhere from a couple years to the better part of decade, if need be.

The benefits of connecting with ORA early in the product development process include, perhaps most importantly, opportunities for industry partners to plan for a more efficient allocation of financial resources. For example, knowing whether a product may require a specific study to gain FDA approval will likely help a team use money and time more effectively and efficiently. Indeed, even if an industry partner is unsure whether the product they're developing needs to meet any FDA requirements at all—products like software or certain types of diagnostics, for instance—ORA can answer those questions before the work even begins.

"By interacting with us early, we hopefully can avoid some of the shortcomings of the product development process," Zottig said. "A lot of pre-clinical trial research doesn't necessarily require extensive FDA oversight, but by the time you need FDA guidance

when entering early product development—by then it's almost too late."

KNOWLEDGE BAKED IN

Because that process needs to be as streamlined as possible, working with ORA is simple. For example, when an industry partner contracts with USAMRDC with the goal of developing a certain product, ORA joins the project management team almost immediately to begin providing advice and guidance on how to ultimately obtain FDA approval. Then, project team members review the proposed testing efforts for the product (clinical trials, toxicity studies, etc.) and discuss the creation of a unique strategy to ensure the product being developed clears all regulatory milestones as required by the FDA. In this way, ORA operates as the "translators" of the regulatory world ensuring that both the FDA and the product developers are speaking the same language in their pursuit of a common goal: FDA approval.

Any product that receives an FDA approval is, of course, the ultimate goal for all involved. Zottig calls ORA the command's "connective tissue" because the office works with so many people and programs within USAMRDC.

This enormous infrastructure allowed ORA to help facilitate portions of the command's response to the coronavirus pandemic. During that time, while USAMRDC was helping secure personal protective equipment like face shields, face masks and specimen collection devices—products it helped physically create via on-site 3D printing technology—ORA teamed with the U.S. Army Medical Materiel Development Activity's Additive Manufacturing Working Group to ensure said products were approved in a compliant manner. While such an effort would've taken years under normal circumstances, ORA was able to process the necessary regulatory requirements for those new products in just weeks due, in large part, to their knowledge and familiarity of the FDA process.

OVERDOSE AVERTED

ORA staff are working with private sector pharmaceutical companies to develop lifesaving treatments for warfighters, including a naloxone auto-injector—similar to the materiel pictured here—to reverse the effects of an opioid overdose on the battlefield. (Photo by Mark Herlihy, U.S. Air Force)

CONCLUSION

For Donovan and the team at ORA, this kind of work is what makes the end-result so rewarding. "What I really take pride in is being part of a team that knows exactly what to do to get something started, do it quickly, and, in essence, get the right product out at the right time for the right needs," Donovan said. "I feel my presence here and my contribution here is really needed, after all, what more could you hope for when you know your work is meaningful?"

For more information about USAMRDC, go to ***https://mrdc.amedd.army.mil****. For more information about ORA, go to* ***https://mrdc.amedd.army.mil/index.cfm/resources/researcher_resources/regulated_activities_overview.***

RAMIN KHALILI is a writer with USAMRDC's Public Affairs Office. Before assuming his current role, he spent five years as the knowledge manager for USAMRDC's Combat Casualty Care Research Program. During his previous work as a broadcast journalist, he earned an Associated Press Award for his work in Phoenix, Arizona, before serving as chief NASA correspondent for CBS in Orlando, Florida. He holds a B.A. in communications from Penn State University. A frequent contributor to Army AL&T, his most recent article, "The Magic Glove," appeared in the Summer 2022 issue.

FIT FOR *THE FUTURE*

Tech-forward Army human performance programs are accelerating force readiness.

by Maureena Thompson

UP TO THE CHALLENGE

Maj. Kenny Torres of Army Futures Command demonstrates the pullup bars during the command's Murph Challenge event at Camp Mabry, Texas, on May 26. The Army is assessing whether incorporating fitness tracking wearables, which some Soldiers already use in their personal lives, into Army human performance initiatives could improve training and conditioning outcomes. (Photos by Austin Thomas, Army Futures Command)

Building the Army of the future requires much more than strategic investments in modern weaponry. From improving the speed and accuracy of information-sharing to piloting innovative talent management structures, the Army continues to focus on investing thoughtfully and extensively in its greatest asset: its people.

While future readiness efforts span the Army's Soldier and civilian workforce, they are especially important for members of the close combat force, who are likely to encounter increasingly dynamic, fast-paced and demanding forms of warfare in the years to come. As such, a number of Army modernization initiatives are studying how the Army can rapidly and effectively enable optimal warfighter health.

Included in these efforts are applied research programs that assess the utility of personal fitness trackers and the data they produce, as well as in-depth research on challenges to peak Soldier wellness. The Holistic Health and Fitness Management System (H2FMS) and Optimizing the Human Weapon System (OHWS) are two such programs examining how the Army can better gather and use human performance data, so that leaders—and Soldiers themselves—can implement intentional changes to strengthen readiness and solidify resiliency.

MORE TO IT

Sgt. Patrick Hill of the Texas National Guard participates in the Army Futures Command Murph Challenge at Camp Mabry, Texas, in May. Completing the strenuous workout—held in honor of fallen U.S. Navy SEAL Lt. Michael P. Murphy—requires both physical and mental toughness.

HOLISTIC HEALTH AND FITNESS MANAGEMENT SYSTEM

Through the H2FMS health and fitness management program, which commenced in August 2021, the Army Applications Laboratory (AAL) is exploring the power of enhanced health monitoring and streamlined data management.

H2FMS seeks to identify the best athlete-management system applications available on the commercial market and test their effectiveness on Soldier populations, with the eventual goal of implementing use across U.S. Army Forces Command.

The project—which launched a six-month pilot in May to test three athlete-management system apps—evolved out of an 82nd Airborne Division request to the lab for assistance with finding tools to advance human performance and readiness while enhancing data-driven decision making.

"Operational units demand that we have solutions to improve our humans so they can be ready and lethal once they reach the battlefield," said Maj. Nick Rinaldi, project manager for the H2FMS program. Rinaldi noted that the lab is well-suited to handle the task because the center focuses at "the warfighter level to identify pain points, refine and curate problems, and then source solutions where we see gaps."

He added that the need for H2FMS reflects "a unit problem that every military entity with humans has: We can't see ourselves well enough to make informed decisions on our human performance as it relates to Soldier lethality."

By "see," Rinaldi means more than just observe in action over a brief period of time. He and his team are interested in understanding the bigger and more enduring picture of individual and unit health through rigorous, long-term data collection and analysis—the type that can illuminate issues a person may not even be aware of.

"This isn't just about the technology," Rinaldi said. "It's about culture and habit-forming."

Through conversations with Soldiers and leaders, as well as integration with broader Army holistic health and fitness efforts, AAL ascertained that the most compelling solutions would address a

HEALTHY FUTURE

Command Sgt. Maj. LaQuaine Bess of Army Futures Command participates in the command's Murph Challenge at Camp Mabry in May. To prepare Soldiers for the future, the Army is addressing a wide range of wellness needs.

spectrum of wellness needs, from physical and mental health to sleep, nutrition and spiritual wellness. Some of these needs might be best supported through in-person outreach or personalized surveys, whereas others could benefit from consistent, objective and tech-enabled health monitoring.

Wearable sensor devices, which collect and relay human performance data to athlete-management system platforms and individual users, thereby driving health decisions, are promising because they provide concrete data, offer interactive capabilities and are already familiar to many Soldiers. Fitbit products fall within this broad category, for example, as does the Health app that comes pre-installed on iPhones.

Rinaldi said that wearable sensor devices have been employed with "varying degrees of success" in U.S. Special Operations Command but are not broadly used across the Army. Through H2FMS, the Army aims to pinpoint and tailor a solution, or multiple solutions, that could eventually be rolled out to all of its equipped brigades within U.S. Army Forces Command and U.S. Army Training and Doctrine Command.

The version of athlete-management system technology that the Army is looking to incorporate would meet the needs of multiple types of Soldiers in multiple wellness areas. Accordingly, the three platforms currently undergoing assessment via the H2FMS pilot are being tested by groups of infantry, military intelligence, medical battalion and reserve Soldiers.

H2FMS also wants to improve data sharing and preservation across various systems. The program is working to foster creation of an "agnostic data storage solution that allows governance of these types of data collection apps without mandating one in particular, which creates flexibility for the divisions and brigades to have a choice in athlete-management system platforms while still keeping the data collected on the individual persistent between units and visible at the Headquarters, Department of the Army level," Rinaldi explained.

H2FMS recognizes that finding the right solutions is key, but so is enabling their rapid implementation, which is why the program syncs its efforts closely with other Army holistic health and fitness initiatives.

"Seeing what's possible is great, but being able to deliver a product that can get implemented in less than two years is critical if we deal in terms of software and data," Rinaldi said. "We are moving appropriately fast and with significant synchronization between science and technology, operational units and transition partners to get this in the hands of warfighters at the speed of relevance."

Rinaldi underscored that "outcomes from this project not only provide solutions to our warfighter now, they inform our science and technology efforts such as OHWS and MASTR-E," the Measuring and Advancing Soldier Tactical Readiness and Effectiveness program, "on potential advances in [athlete-management system] solutions." The program aims to measure and predict Soldier combat performance more precisely.

The Applications Lab collaborates regularly and closely with the U.S. Army Combat Capabilities Development Command (DEVCOM) Soldier Center and other Army and joint force stakeholders to ensure human performance needs of the warfighter are assessed rigorously and holistically.

PROMOTING WELLNESS AND HEALTH

As the Army modernizes how it tracks and promotes Soldier wellness, it is also developing more innovative, effective and resilient health care concepts and infrastructures. Plans for these future-oriented systems and approaches are captured in the Army Medical Modernization Strategy, which outlines how the Army will transform its formations, capabilities and people to build a state-of-the-art Army Health System.

MEDICAL CAPABILITY
Soldiers demonstrate new medical technologies during MRDC's Capability Days at Fort Detrick, Maryland, in April.

OPTIMIZING THE HUMAN WEAPON SYSTEM

The mission of the Soldier Effectiveness Directorate at the DEVCOM Soldier Center is "to deliver unprecedented capability through innovation, research, development and technical integration to maximize Soldier effectiveness and readiness."

The importance of this undertaking is not something the directorate takes lightly, and its commitment to furthering Soldier readiness is apparent in the robustness of the programs it executes, including the OHWS program.

OHWS, which is jointly supported by DEVCOM and the U.S. Army Medical Research and Development Command (MRDC), originated from a question posed in 2020 by the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology, which was essentially, "Can you use commercial, off-the-shelf wearable technologies for diagnostics of COVID-19?"

While the answer at the time was no, DEVCOM and MRDC did note that commercially available technologies could assist with Soldier "screening and triage" in operational settings, as well as provide "better leader engagement tools in order to promote well-being and optimization of the warfighter," explained Joseph Patterson, a Soldier performance strategist at the DEVCOM Soldier Center and project manager for the OHWS program.

As a result, OHWS was designed to investigate whether and how wearable technologies could support the operational readiness of Soldiers preparing for deployment, recognizing that COVID-19 and stress could both have negative effects on numerous health parameters.

"Your physiology doesn't care if you're sick or you're stressed because you've had a bad fight or you're stressed because you went on a 12-mile road march," Patterson said. "Physiology just responds to stress; it doesn't care what the stress is."

With members of the 4th Battalion, 31st Infantry Regiment, 2nd Brigade Combat Team, 10th Mountain Division serving as study subjects, the program began focusing on how to use wearable sensors and athlete-management system products to evaluate core concerns of susceptibility to illness, enhanced mission command, prevention of injury, sustainment and optimization.

"We take best-of-breed sport technologies and bring them into the military to give us insights that we've never had before," Patterson said of the process.

The program currently is testing the Oura Ring, a wearable sensor and app, to track recovery and sleep; the Polar Grit X Pro outdoor watch to track exertion, including heart rate and muscle load; and the Smartabase software platform to collect and analyze aggregate performance data.

The program started testing the effectiveness of commercial off-the-shelf wearables and athlete management software with a

cohort of 600 infantry Soldiers, but hopes to expand that figure to 4,000, evaluating the impact on an entire brigade combat team.

"It's a true partnership between research and the operational community," Patterson said, emphasizing that the point is not the specific hardware or software but rather enabling more reliable and robust human data to inform operational decision-making.

OHWS is also exploring whether a bring-your-own-device model would be feasible for Soldiers already using personal commercial wearables, in order to "leverage the investments that people are already making for themselves."

Athlete-management systems and wearables are influential because they can amplify training, education and leadership around Soldier health and wellness. If devices can show individuals how their choices impact their performance, they can then feel empowered to make changes that result in a healthier lifestyle and greater longevity. At the same time, health trackers worn by a group of Soldiers can collectively provide leaders with additional engagement tools and new information on how to create the best performance ecosystems possible.

"When it comes to data, context is king," Patterson said.

Beyond the operational environment, OHWS program wearables have been tested in combat diver qualification and maritime preparatory courses, as well as in best warrior, leader or medic competitions. Using the devices in elite training settings can illustrate "how states in readiness ebb and flow," providing OHWS researchers and unit leaders with insights on how to hone performance. "We look at these tools and how they actually make people smarter, faster, more lethal and precise at the individual level," as well as how they influence "echelon-based decision-making," Patterson explained.

"Our goal is that human performance data becomes an integral part of mission command, movement, maneuver, protection and sustainment, which are warfighting functions," he elaborated. "If we can figure out how we fight with this data, then we're always putting our formations in a position to succeed instead of fail."

Initial results have already prompted some adjustments to training battle rhythms at the battalion level to allow for more deliberate and effective rest cycles. Signals captured by the wearables have also increased leaders' awareness of Soldier social and emotional well-being and enabled timely interventions with individuals experiencing abnormal levels of stress.

The program's evaluation of devices is carried out in coordination with complementary efforts by other branches of the military as well as with university research partners.

"We work synergistically across DOD to make sure we understand the validation of these devices," including "what they're good for and what they're not good for," Patterson said. "This is all about trying to have a 'coalition of the willing' across the services, because the human is the only capability that is constant within the services."

OHWS, like H2FMS, looks to support health and wellness as part of the Army holistic health and fitness effort.

CONCLUSION

In addition to creating programs that assess how to best collect and use Soldier fitness and wellness data, the Army conducts an array of in-depth research focused on understanding and improving Soldier health.

Researchers at the DEVCOM Army Research Laboratory, for example, investigate and publish research papers on topics ranging from neurological impacts of sleeping during the day to the effects of prior mental fatigue on marksmanship. Meanwhile, researchers at MRDC's Walter Reed Army Institute of Research and the Army Research Institute of Environmental Medicine have performed research on the effects of sleep loss on marksmanship, musculoskeletal injuries and resilience; with additional research on how to support readiness and recovery from sleep restriction and deprivation in the operational environment.

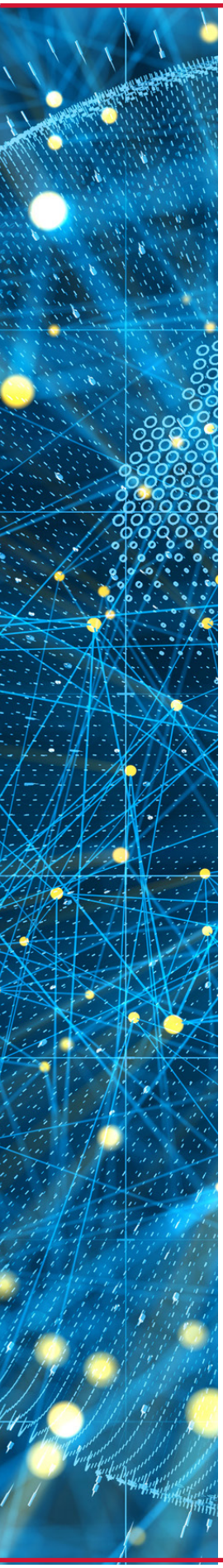
By uniting these and other activities with performance development programs being carried out across the joint force, the Army is helping to ensure that tomorrow's Soldiers are equipped with the advanced human performance knowledge, skills and resources they need to succeed in future operational environments.

For more information, go to: ***https://armyfuturescommand.com.***

MAUREENA THOMPSON is a contracted writer and editor with Army Futures Command in Austin, Texas. She holds a Master of Public Policy with a concentration in national security from Duke University and a B.A. in English from the University of California, Los Angeles.

DATA SOLUTIONS

Maintaining a military that is prepared to face uncertain future security challenges often requires the acquisition and procurement of new and technologically advanced equipment, which is a major expense for any nation. Technical data escrow is an optimal solution that benefits both the developer and the contracting party to mitigate some risks when negotiating a license for software, technology or relevant IP. (Image by Getty Images)



TECHNICAL DATA ESCROW IS THE *NEW* BLACK

CECOM is shaking up technical data acquisition by seeking neutral ground on government access to intellectual property.

by Troy C. Saunders

Right now, seemingly more than ever before, the Army sustainment community is facing unprecedented challenges from emerging cyber threats, complex and swiftly evolving technology, and rapid innovation by near-peer adversaries. Fortunately, the Army recognizes that it cannot overcome these challenges with outdated equipment, technology and policies. Over the past few decades, the Army has developed a number of modernization and acquisition reforms to enable the delivery of new warfighting capabilities more rapidly and cost-effectively than in the past.

One of goals of these reforms is to change the Army's approach to managing intellectual property (IP). IP can include any product of the human mind that is protected by law, including patents, inventions, manufacturing processes, computer software and technical data. It plays a critical role in the military's ability to modernize weapons systems while maintaining and sustaining technological dominance. Indeed, in December 2019, then-Secretary of the Army Mark Esper said, "More than ever, IP is playing a critical role in our ability to modernize our weapon systems and maintain technological overmatch against our peers and near-peers."

The laws and practices surrounding intellectual property rights are complex, costly and often difficult to manage. As a result, the Army must ensure that the policies and practices governing IP provide the necessary access to effectively support Soldiers and their equipment, while also encouraging innovation from industry partners and the swift delivery of new solutions. Partnership with the industrial base is critical to developing the capabilities needed to be successful during current and future conflicts.

LET'S BE FAIR

It is also crucial that the appropriate safeguards and protections for industry investment are implemented, keeping long-term sustainment considerations in mind. These safeguards and protections can improve readiness, reduce sustainment costs and increase overall acquisition speed.

Unsurprisingly, the Army has no shortage of hard-charging leaders and innovators who have put in the time and effort to manage costs and streamline the acquisition and sustainment management processes more efficiently. One leader in the world of Army acquisition has been strengthening a reformative concept to help shape a formidable and efficient future Army force.

REFORM BEGINS AT HOME

Danielle Moyer, the dual-hatted deputy director to the U.S. Army Communications-Electronics Command (CECOM) Software Engineering Center and director of the CECOM Office of Acquisition Support, along with her colleagues at Aberdeen Proving Ground, Maryland, have been using unique and innovative strategies and a reformative concept to elevate the culture of the industry and improve how the Army does business.

"What I'm proposing is that we don't go back to those old ways, where we spent so much time and money on developing things ourselves," Moyer said. "There's a middle ground to still buy commercial off-the-shelf items and nondevelopmental items, to get them fielded fast and tested quickly and, at the same time, consider the total life cycle of the system." Nondevelopmental items are like commercial products that the Army does not request or pay for the development of but are exclusively sold to the Army and DOD.

That middle ground Moyer uses is a concept known as technical data escrow—an optimal solution that benefits both the developer and the contracting party to mitigate some risks when negotiating a license for software, technology or relevant IP.

The data escrow account is held by a third party, and is then populated by the manufacturer contractor with designated technical data, blueprint or source code, and will only open and be usable under specified, mutually agreed-upon conditions known as "triggering events."

Examples of triggering events in the Army acquisition context can range from simple to very complex. This can include a contracting party filing for bankruptcy, or a contracting party that is just unable to provide sustainment support, such as spare part replacements, repairs, software patches, software integration, bug fixes, etc., or simply a manufacturer deciding it no longer wants to be in a specific market.

UNDERSTANDING ESCROW

"An escrow account is like an insurance policy that the Army is the beneficiary to," said Michael Gomes, chief of the Tactical Radios Branch and contracting officer and an agreements officer for the Army Contracting Command at Aberdeen Proving Ground—and Moyer's colleague.

Escrow accounts can help to mitigate the risk of discontinued sustainment support, which can potentially save the Army acquisition community frustration, money and—most importantly—time. Escrow accounts can offer the Army acquisition community a significantly cheaper solution than outright purchase because the government only receives the data deposited into the escrow account. When properly leveraged, escrow accounts provide an additional tool to encourage contractors to continue supporting products, while simultaneously providing the government with a path to ensure continued sustainment in any situation.

Technical data acquisition is often seen as an all-or-nothing game: Either the government buys an expensive technical data package upfront or the contractor holds all the technical data rights, and the government assumes more risk in sustainment. Negotiations for limited IP rights or piecemeal technical data packages often slow the contracting process and can put a whole program schedule at risk.

The technical data escrow concept provides a more flexible option than just purchasing a technical data package. The arrangement protects government interests and is more affordable than purchasing a technical data package outright, and it also provides increased flexibility for the contractor.

"If [a manufacturer] goes out of business, how will we get their data rights to sustain a system, hardware and software?" Moyer said, describing the current practices. "How will we ensure the Army doesn't have to start from scratch and that there are not fielded systems inoperable due to lack of long-term planning? Planning for the total life cycle of a system that includes something like data escrow up front is a game changer for the Army."

The concept provides an affordable way to contract for data that protects government interests while, at the same time, aligning the Army with contemporary and competitive industry practices.

MAKE IT LIKE BUSINESS

In the world of Army contracting, Moyer has found that insurance for technical data rights is vital for the sustainment process to be successful. As the lead contracting person for both the Product Manager for Airborne Maritime Fixed Station Programs and the Program Executive Office for Command, Control and

DOWN TO BUSINESS

Danielle Moyer, deputy director of the U.S. Army Communications-Electronics Command (CECOM) Software Engineering Center (SEC), and her colleagues discuss new ways the Army can do business and save money in the SEC Headquarters at Aberdeen Proving Ground, Maryland. (Photo by U.S. Army Communications-Electronics Command)

Communications-Tactical, Moyer and her colleague Donald Morgan originally started applying data escrow principles to Army contracts while working on tactical radio contracts in 2013. This led to Moyer and Gomes formally leading the technical data escrow concept across the entire Army Material Command in 2015.

"We all knew that during testing a system can break or something can go wrong; it's part of the point of testing. Do we just throw that entire system out and buy a whole new one, or is there something in that system's contract that should fix it at an affordable rate? The same things apply when it's fielded, we need to have reach-back to fix sustainment systems at an affordable rate and expeditiously," Moyer said.

Moyer was envisaging these considerations and working towards tangible solutions before coming aboard as CECOM's contracting lead.

"I thought about all of the things we could do if we thought about them upfront in those PEO contracts. How do we connect all of the different [manufacturers] and manage the contracting process during the total life cycle of a system? What happens when [manufacturers] go out of business? Where are we going to get the parts and directions fast and affordably?"

Moyer asked herself these questions and started to work out the potential benefits of applying industry practices to Army contracts.

"I thought, 'What about escrow?' " she said. "I found that Amazon and Walmart are involved in a data escrow with their tech data. They ask a third party to hold a vendor's data and data rights in an escrow account that acts as a kind of insurance policy so that if a vendor fails to perform on part of a contract, the buyer can get the data and data rights and either perform sustainment themselves or re-contract from there."

CYBER FOCUSED
With cyberspace as the newest warfighting domain on par with air, land, sea and space, the Army is heavily investing in strategies to sustain its multidomain capabilities. (Image courtesy of U.S. Army Communications-Electronics Command)

CONCLUSION

As Moyer and her CECOM colleagues look to the future of contract reform initiatives, they have been actively reaching out to other organizations for feedback and for opportunities to share their lessons learned.

"I've reached out to leaders in the Army outside our command," she said. "My hope is that other Army and DOD organizations use our lessons learned and apply our total life cycle planning strategies to their systems early."

Even though the concept of data escrow has been proven successful in the commercial marketplace, the government has yet to widely embrace this innovative approach to acquisition support. As the DOD and Army begin to shape more agile and modern sustainment strategies, adopting the best acquisition practices is key to staying ahead of near-peer adversaries.

The efforts of Moyer and her team at Aberdeen Proving Ground have helped streamline the contracting process for a multitude of CECOM programs. And, while acknowledging the challenges the industry faces, she is very hopeful that their work will inspire others to take new approaches towards finding that coveted middle ground between two traditional avenues of technical data acquisition.

"We are trying to get the acquisition community to see how we approach contracting and the benefits of an initiative," she said. "We want to figure out how to plan for the total life cycle of a system in the smartest way possible for the Army. And how that can be tailored to any individual product."

With the current geopolitical landscape and an increased focus on cybersecurity, Moyer echoes other leaders in the military acquisition community who call for a more harmonious relationship with the private business sector. Concepts such as data escrow, when properly leveraged, can be a win-win situation for both commercial industry and the Army.

"Army leaders need to have great relationships with industry, because the Army needs industry in order to win on the battlefield," she said. Building the future force means not only new technology and weapons systems, but new business processes, too, and the work that Moyer and the larger Army acquisition community do every day helps keep our Soldiers safe and equipped to fight.

For more information, go to ***www.cecom.army.mil****.*

TROY C. SAUNDERS provides contract support to the U.S. Army Communications-Electronics Command as a senior communications specialist. A Marine Corps veteran and Defense Information School graduate, he has years of experience in broadcasting and telling the unique and special stories of servicemen and servicewomen around the world.

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WORK HERE

NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA

STAFF SGT. ABHIRAM PALIVELA

COMMAND/ORGANIZATION: 928th Contracting Battalion

TITLE: Contract specialist

YEARS OF SERVICE IN WORKFORCE: 1

YEARS OF MILITARY SERVICE: 7

DAWIA CERTIFICATIONS: DOD contracting professional

EDUCATION: M.S. in engineering management, Syracuse University; B.E. in electronics and communications, Sathyabama University

AWARDS: Army Commendation Medal (3rd award); Army Achievement Medal (6th award); Army Good Conduct Medal (2nd award); National Defense Service Medal; Global War on Terrorism Service Medal; Armed Forces Service Medal; Non-Commissioned Officer Professional Development Ribbon; Army Service Ribbon; Certificate of Achievement (3rd Certificate); Driver and Mechanic Badge and Marksmanship Qualification Badge–with Carbine

BUSINESS AS USUAL

On-the-job training is an essential part of the package for any new hire, but if they happen to have a well-rounded assortment of work experience, it's a bonus.

An active-duty Soldier since February 2015, Staff Sgt. Abhiram Palivela joined the Army Acquisition Workforce just one year ago as a contract specialist with the 928th Contracting Battalion, stationed in Grafenwohr (Bavaria, Germany). He may be relatively new to Army acquisition but, for him, preparing contracts really isn't anything new.

Before joining the Army, Palivela was the owner of an Indian restaurant, Thulasi Kitchen, in Madison, Wisconsin for two years. He's familiar with small business contracts, but said he was always intrigued by the "big Army contracting" world.

Palivela said that his primary focus is writing contracts for supply buys, services and executing task orders against existing service contracts. "Everything we do has a greater impact on the Army or warfighter as it is focused towards equipping the warfighter with what they need to win wars, such as basic life support that includes …transportation, food, latrines, showers, etc."

Outside of work, he said, people are intrigued by the different aspects of his job, and the questions they have about his role typically vary—depending on the person and level of interest—but he said mainly they're curious about "the different kinds of military contracts and the money involved."

Palivela began his career as a software engineer, technical lead for Dean Health Plan, Inc. (a healthcare insurance company) in Madison, Wisconsin, where he worked for four years providing analysis, design, development and implementation, testing and support for data warehousing applications. Then, as an active duty Soldier, just before joining the acquisition workforce as contract specialist, Palivela served as practice manager at Stuttgart Dental Clinic Command, Germany for two years.

Through these diversified career choices, Palivela acquired an abundance of knowledge about how different types of businesses function and operate—valuable experience that he can apply to any role he takes on.

He said that most people know him as a "software engineer" given his industry software experience. And that compared to Army acquisition, "the software field is more of thinking outside the box, building an innovative code from scratch to develop a specific application, whereas the acquisition field is more streamlined with defined federal regulations which require us to strictly abide by the rules and regulations set in place to do any type of contract."

Palivela grew up in Hyderabad, India, and came to the United States in Aug. 2009 to obtain a master's degree from Syracuse University. He then joined the

Army and served as a noncommissioned officer administration-and-operations supervisor and squad leader-in-charge of the administrative operations of Joint Base Lewis McChord Dining Facility. He was responsible for supervising, manning, budgeting and smooth operations of the facility—including the management of 10 noncommissioned officers and 50 junior enlisted personnel.

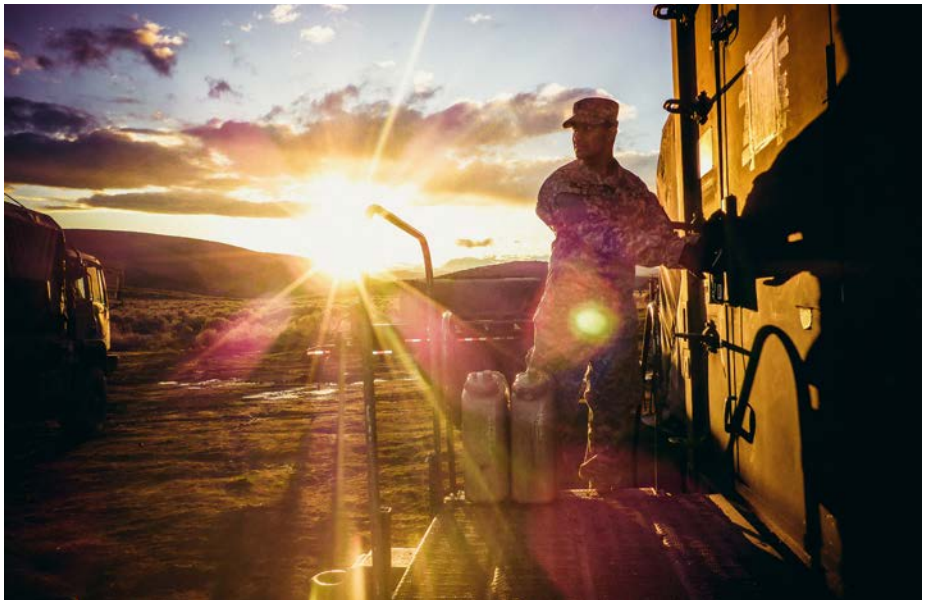
In 2020, he was among a group of Soldiers selected into the 51C military occupational specialty (MOS) for contracting, and graduated the Army Acquisition Professionals Course in March 2021. As part of the reclassification process, Palivela said that candidates "have the opportunity to take a deep dive into the world of federal acquisitions and gain valuable information and skills through the training, education and professional development aspects of the MOS."

He said that the experience he's already gained has been his career development program. "So far, I am proud to say that I have made a great decision jumping on board the acquisition workforce."

"Being in this position for one year, right now it is hard for me to say what the important career points within the acquisition workforce are; however, hearing from my peers, I would definitely consider going to an assignment that involves the Army Corps of Engineers [construction] and the Training with Industry [TWI] program," he said. The TWI work-experience program is designed to provide extensive exposure to managerial techniques and industrial procedures within corporate America.

"Everything we do has a greater impact on the Army or warfighter."

Palivela said he hasn't yet had an opportunity to offer any advice to junior acquisition personnel, but if and when he gets the chance, he would suggest that they "keep an open mind as one can never know everything about acquisition. Every day is a real learning experience and the longer we are in this field the deeper we dive into the federal regulations, the variety of experiences increase, teaching us something new about what we thought we already knew."



DINNER PREPARATIONS

Palivela owned a restaurant before becoming a Soldier, so he's in his element fueling the containerized kitchen before dinner at Yakima Training Center, Washington. (Photo courtesy of Staff Sgt. Abhiram Palivela)

He said what remains consistent no matter what the instance—both in and outside of work—is that being resilient to any given situation is something that he strongly believes in. "I have seen firsthand how things can change drastically," he said. "Being resilient and calm always gets me working on finding a solution to the problem and able to see the light at the end of the tunnel."

"The greatest satisfaction I receive from being a part of the Army Acquisition Workforce is to realize the fact that we are the 'force behind the force' enabling the warfighter to be well equipped in order to train beyond standards and win wars."

—CHERYL MARINO

OPTIONALLY MANNED MOCK-UP

U.S. Army Soldiers sit in a mock-up of the Soldier compartment of a potential design of an Optionally Manned Fighting Vehicle during a Soldier touch point at the Detroit Arsenal in February. Soldier touch points allow engineers and designers to validate future requirements for the vehicle. (Photo courtesy of Next-Generation Combat Vehicles Cross-Functional Team)

TWENTY-FIRST CENTURY APPROACH TO ACQUISITION DRIVES FIGHTING VEHICLE PROCESS

The Optionally Manned Fighting Vehicle digital concept design provides a new paradigm for combat-vehicle development.

by Dan Heaton

The challenges associated with the processes for establishing stable and achievable requirements in support of past ground combat vehicle acquisition programs are widely documented. Yet, within a process long influenced by administrative compliance and highly localized experience, effective solutions to persistent Army requirements challenges have remained elusive.

The Optionally Manned Fighting Vehicle (OMFV), an initial description for the Army's next generation infantry fighting vehicle, provided Army Futures Command (AFC), the assistant secretary of the Army for acquisition, logistics, and technology (ASA(ALT)), Army Contracting Command and industry an opportunity to explore a new 21st century approach.

The OMFV digital concept design provides a case study for how the Army can change the way requirements are defined, refined and stabilized in support of acquiring new, complex ground-combat weapon systems. In a departure from previous practices, the Army strategy included early formal collaboration with industry to inform and assess requirement feasibility, suitability and acceptability before soliciting for prototypes, robust analysis to gauge the effectiveness of capabilities and Soldier touch points that allowed the ultimate end user an opportunity to influence the design of the vehicle early in the development process.

The goal is to produce an infantry fighting vehicle that exploits industry innovation and modern design tools today to both address infantry fighting vehicle modernization needs now, and permit upgrading or integrating future new technologies quickly and economically to it into formations as soon as possible.

REQUIREMENTS AND OTHER FANTASIES

In past programs, Army requirements developers produced a very detailed list of specifications that companies would use to develop their proposal. This left little to no room for innovation or refinement as technologies or threats changed over time. In too many cases, requirements would call for implementing new, evolving technology, only to find that technology was not quite ready for use in the field.

In other cases, a proprietary technology procured during the development of the initial vehicle configuration limited the Army's ability to adapt to new technologies or operational needs years and multiple iterations later. And finally, opportunities to exploit industry innovation and new approaches were missed simply because there was no approved requirement. The system depended

upon perfect predictions many years in advance of application by Soldiers. Vehicle requirements became fluid as operating environment conditions changed or new requirements were added late in lengthy development cycles, causing cost projections to skyrocket.

Past efforts to develop a new infantry fighting vehicle to replace the Bradley in our armored brigade combat teams did not come to fruition. Those efforts are well-documented elsewhere and do not need to be re-hashed here. What is important to note is that the Army is a learning organization. We learned from our past efforts and modified our approach to developing combat vehicles. With OMFV, the opportunity to change the historical dynamic is available thanks to more flexible and modern program management tools such as the middle tier of acquisition pathway and digital engineering.

THE RIGHT BALANCE

Using these tools, the Next-Generation Combat Vehicle Cross-Functional Team, the Project Manager for Mounted Combat Systems and the Ground Vehicle Systems Center crafted an approach to OMFV requirements development and refinement incorporating several key themes:

Communicating broad design characteristics for industry to focus their design capabilities and innovation on addressing our capability gaps, rather than requiring compliance with overly technical requirements, based on imperfect assumptions or legacy approaches. The Army awarded contracts to five prime vendors to develop digital designs for the specific purpose of informing and maturing initial characteristics into more detailed requirements. The nine "characteristics of need," in priority order, are: **survivability, mobility, growth, lethality, weight, logistics, transportability, manning and training.** In each of those nine areas, the Army challenged vendors to provide their best overall solution.

Collaborative, rather than transactional engagements between government and industry. This approach allows government and industry to come together to a common understanding of what technology is ready and affordable today vs. what is not yet ready for integration at scale and operational implementation. Initially, some vendors were skeptical that the Army was serious about change, but close collaboration and open dialogue produced productive refinement of requirements. Model-based systems engineering and modular open system architecture standards enabled use of competing vendor concepts and digital designs to explore different approaches to the right balance between the needs for mobility, survivability, lethality, and, since this is an infantry fighting vehicle, how many Soldiers can feasibly be delivered safely onto an objective.

Requirements analysis and definition. Over a period of 12 months with five vendor digital designs, the Army completed 11 distinct analytical efforts—ranging from fuel consumption expectations to survivability against known threats. Through these efforts, the Army provided vendors four revisions of draft performance specifications, received over 2,000 comments from government and industry technical experts, conducted three digital design reviews with each vendor, and had four total months of Soldier touch points providing user feedback on vendor designs.

Modeling and simulation. Vendor digital designs assessed through government modeling and simulation tools refined the nine broad characteristics of need into 28 detailed and prioritized attributes. We were able to see, question and understand relationships between performance and cost across engineering and operational expectations well before committing to expensive, long lead physical prototypes. By placing Soldiers into virtual OMFVs, the Army was able to determine if the vehicle designs were realistic and feasible. We were able to run extensive simulations to explore the impacts of different decisions and proposals to determine if our requirement prioritization is correct.

Soldier centered design. Soldiers from Armored brigade combat teams engaged directly with virtual designs, and later with virtual prototypes and physical models. The Ground Vehicle Systems Center created virtual environments for Soldiers to experience each vendor's approach. Soldiers directly helped engineers and designers understand how human performance with new capabilities and design requirements influence desired system effectiveness objectives. The value of gaining these Soldier inputs early in the process cannot be overemphasized.

"This approach brings a stability of requirements to the process—nobody has to guess what the requirements will be."

MATERIAL MATTERS
Maj. Matthew Burton, left, OMFV requirements officer at the Next-Generation Combat Vehicles Cross-Functional Team (NGCV CFT), and Sgt. 1st Class Salem Auclair, OMFV master gunner for the team, review materials related to the OMFV at the Detroit Arsenal on July 20. Burton and Auclair have both worked with the team for about two years. (Photo by the author)

In this refinement phase, we did not attempt to assess which vendor design was best, or which would become the basis for the Army's requirement. Instead, we used the opportunity to explore different approaches with vendors possessing expertise in the design, development and manufacturing of combat vehicles to better understand the trade-offs and feasibility parameters required to issue a later solicitation with confidence.

The change to the Army's approach also fundamentally changed the interaction with government and industry, in that the focus was the development of digital designs to inform requirement maturation. Vendors were no longer solely focused on compliance and winning a competition but, rather, focused on aiding the production of a feasible list of requirements that increases the likelihood of a successfully executed OMFV program in the future.

Throughout the concept design phase, the vendors refined their approaches and collaborated with Army users and engineers, refining their design attributes to move closer to informing a feasible and acceptable range of OMFV requirements. Additionally, this phase provided a priceless opportunity for all parties to learn about the realm of the possible. Although the Army would love to have a vehicle with an infinite amount of capability for its Soldiers, it must be mindful that the more capability it adds, the heavier and more expensive the vehicle will be. There are often unintended consequences to every decision and this phased approach allows a community of experts to come together to see the impacts of each requirement decision.

"We acknowledge upfront that the Army doesn't know everything. We know what a lot of the possibilities are, but we acknowledge that industry may know things upfront that we don't know. What we didn't want was to create a requirement that said the vehicle must be able to travel 42 miles per hour and then have Vendor X develop a proposal that exceeds all our expectations, but only goes 41 miles per hour and we automatically have to reject it. We wanted to create that trade space where we truly can create the best possible product and deliver it to the Soldiers in the field," said Maj. Matthew Burton, OMFV requirements officer for the Next-Generation Combat Vehicles Cross-Functional Team at Detroit Arsenal.

GO AHEAD, BREAK IT

Some six months after the government awarded five separate contracts, the Army took each vendor's concept design, incorporated them into the Army's modeling and simulation tools, and brought in a group of infantry Soldiers to test them. Working at the Detroit Arsenal starting in January, the Soldiers spent two weeks interacting with each design, first in a virtual reality setting and then in a full-size mock-up of the crew compartments.

"As important as it was for the vendors to be able to talk to the Soldiers and hear their inputs, I think that was really secondary to that touch point," said Melissa Morgan, a mechanical engineer who serves as the test and evaluation advisor to the Next-Generation Combat Vehicles Cross-Functional Team. "What really came out of that experience was our ability to validate and stabilize the requirements we will

The change to the Army's approach also fundamentally changed the interaction with government and industry.

have for developing the actual prototypes in the next phase of the process. These Soldiers interacted with the actual dimensions and capabilities proposed by the vendors, giving everyone at the table confidence in the feasibility of what each vendor proposed."

With requirements that have now been identified as realistic, stable and feasible, the government is moving into the next phase of the OMFV program and intends to select up to three vendors from a full and open competition to create a detailed design for their OMFV proposal and build physical vehicle prototypes. Once those detailed designs are produced in the third quarter of fiscal year 2023, the Army will again provide feedback from both engineers and Soldiers from armored brigade combat teams. The process will continue to fine-tune requirements before a contract is awarded to a single vendor to produce the vehicle. The Army intends to field OMFVs to the first unit equipped in the 2029 fiscal year.

"This approach brings a stability of requirements to the process—nobody has to guess what the requirements will be," said Burton. "It also allows the true end-user, our Soldiers, to have input early in the process rather than waiting until the end when it is too late or too expensive to change things."

CONCLUSION

While the OMFV may be one of the most high-profile programs currently using the mid-tier pathway in the Army it is far from the only one. Other projects using the mid-tier process include another Next-Generation Combat Vehicle signature program, the Mobile Protected Firepower, as well as the Next Generation Squad Weapons and the Small Multipurpose Equipment Transport programs, among others. Other uniformed services have taken advantage of the mid-tier authority for multiple programs, ranging from communications and software to missiles and weapon systems, including the major upgrade of an Air Force fighter jet, the F-15EX.

"The way that we are maturing our requirements on OMFV, collaborating with Soldiers, vendors, the acquisition community—it is transforming the way that we acquire combat vehicles. It allows us to not have to make decisions prematurely and ultimately will produce the best possible asset for our Soldiers on the battlefield," Morgan said.

OMFV requirements-development represents a successful collaboration among AFC, ASA(ALT) and industry to improve confidence and credibility in requirements before soliciting for solutions. However, we are still early in the campaign, so this story is merely a spot report along the way. We understand that success for the Army is measured against delivery of an end product, not intentions or process. We also recognize that the diversity of Army modernization programs precludes any one-size-fits-all approach. However, through collaboration, experimentation and open dialogue we can change how the Army modernizes its acquisition processes and outcomes. We share this experience in that spirit.

For more information, go to ***https://armyfuturescommand.com****.*

SUCCESS STORY

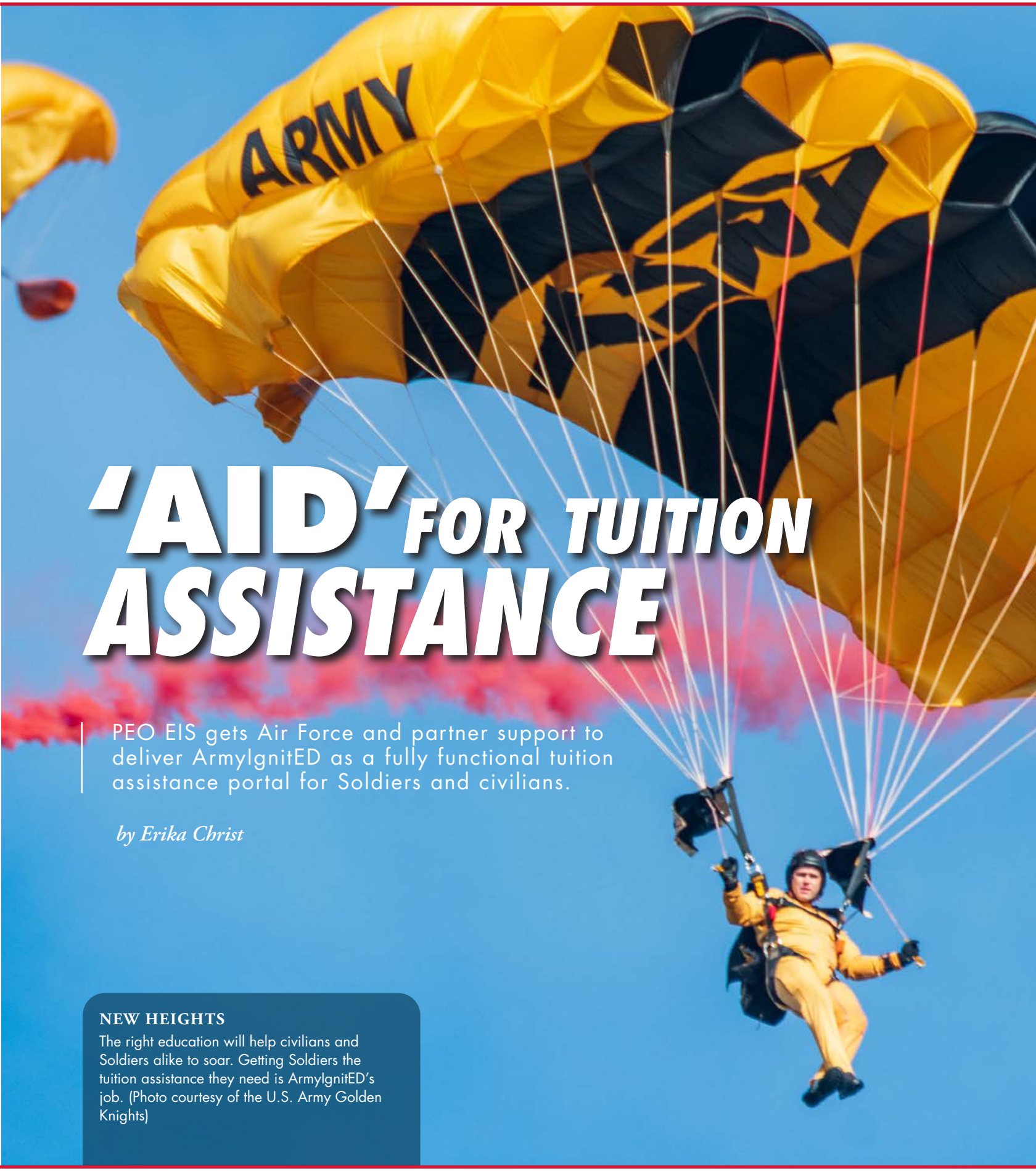
While Soldier touch points principally allow the Army to validate and finalize requirements for a new system, they also have a side benefit, said Sgt. 1st Class Salem Auclair, a master gunner who works on the Optionally Manned Fighting Vehicle project. Each of the dozen Soldiers who participated in the event returned to their platoons when the touch points concluded and told their peers what they had experienced.

DAN HEATON is the director of communications for the Next-Generation Combat Vehicles Cross-Functional Team. He joined the team in 2020 after a long career in journalism and as a public information officer for local government. He also serves as an enlisted public affairs specialist in the Michigan Air National Guard and is the author of three books on topics related to military history. He holds an M.S. in marketing from Walsh College.

'AID' FOR TUITION ASSISTANCE

PEO EIS gets Air Force and partner support to deliver ArmyIgnitED as a fully functional tuition assistance portal for Soldiers and civilians.

by Erika Christ



NEW HEIGHTS
The right education will help civilians and Soldiers alike to soar. Getting Soldiers the tuition assistance they need is ArmyIgnitED's job. (Photo courtesy of the U.S. Army Golden Knights)

What do you do when you inherit a high-profile, software-based program that needs to be fixed fast? Stand up a new program office and plan a brand-new acquisition strategy? Send out requests for information or schedule an industry day to see what options are available?

If you're the Program Executive Office for Enterprise Information Systems (PEO EIS), you use your extensive programmatic and acquisition experience, as well as your in-depth technical expertise, to craft a different path forward—one that entails working closely with the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)) to tailor the Adaptive Acquisition Framework to rapidly respond to a critical acquisition problem.

ASSESSING THE CHALLENGE

When PEO EIS first became engaged in conversations about ArmyIgnitED, a tuition assistance portal that replaced the GoArmyEd platform in mid-2021, the system was experiencing stability challenges that hindered Soldiers from receiving tuition assistance, counselors from reviewing and approving applications, and the Army from making payments to educational institutions. The general thinking among stakeholders involved with the project—including its new owner, the U.S. Army Training and Doctrine Command (TRADOC)—was that PEO EIS, with its strong understanding of business system requirements and acquisition, would be able to exercise the proper authorities and get the online system working as intended.

In January, PEO EIS's Acquisition Innovation Directorate (AID)—known at the time as the Director, Acquisition Systems Management/Strategic Initiatives Group—rolled up its sleeves and got to work. The first order of business was briefing the then-senior official performing the duties of the under secretary of the Army, who gave PEO EIS a fall 2022 deadline to deliver the initial capability. Given the compact time frame, the directorate conducted an accelerated analysis of alternatives, considering falling back on GoArmyEd, as well as potential modifications to the existing system and solutions implemented by other military services.

A PROVEN SOLUTION

PEO EIS was particularly intrigued by the Air Force Automated Education Management System (AFAEMS), an enterprise-wide, web-based application used to manage the Air Force Voluntary Education and Training Program overseen by force development flights. The education and training portal manages an Airman's complete education and training record, tuition assistance budget and all related processes, automating all routine tasks performed by force-development personnel.

While Air Force processes differ from those of the Army, they fulfill the same function and have similar requirements, according to Aric Sherwood, director of the Acquisition Innovation Directorate at PEO EIS. During technology exchanges PEO EIS held with TRADOC's Combined Arms Center and the Air Force, the technical aspects of AFAEMS seemed to be a good match, and Air Force leaders were receptive to the Army's potential tailoring of the system to its own needs via business process re-engineering. In fact, many Soldiers currently use AFAEMS for education conducted by the Air Force, and the Florida National

FIRST 'AID' TO PMOs

PEO EIS's Acquisition Innovation Directorate (AID) relaunched under its new name earlier this year with a focus on helping the organization's project managers and directors determine which project management office (PMO) should oversee a new program requirement, then working with that PMO to develop the acquisition strategy and documentation.

The directorate team—composed of several acquisition and program management specialists—has two primary areas of focus: acquisition support and strategic initiatives. Acquisition support provides guidance on all acquisition-related matters, from documentation review to transitioning new program starts for execution. Strategic initiatives leverage team members' executive-level contracting and technical expertise to help plan new operational initiatives.

Besides ArmyIgnitED, some of the key initiatives that the directorate will be focused on in coming months include the Army case-execution system, the enterprise services infrastructure, and the theater medical information requirement. The directorate also will develop tools for PMO leadership, including a checklist of required documents for shaping programs in the acquisition pathway and supporting project managers' execution of those programs.

TEAM AID

Acquisition Innovation Directorate team members, from left, Ron Crevecoeur, Rachel Solis, Mike Hildebrandt, Aric Sherwood, Erin Rusnak, Monica Wilkins and Solaiman Afzal in February. The team has two primary areas of focus: acquisition support and strategic initiatives. (Photo by Laura Edwards, PEO EIS)

Guard uses AFAEMS for all voluntary education requests.

The Army University was open to changing the underlying technology powering its ArmyIgnitED website and exploring the Air Force's government off-the-shelf solution, which is hosted in Cloud One—the Air Force's highly secure cloud platform.

THE ACQUISITION PROCESS FASTER

PEO EIS began quickly and methodically putting the pieces in place to officially assume ownership of the acquisition process, becoming the office of primary responsibility, identifying a source of funding from TRADOC G-8 and keeping senior leaders informed.

Given the tight timeline required for delivering initial capability, PEO EIS realized that the rigor and duration of the traditional acquisition process weren't going to mesh well with the organization's need to promptly award a contract. PEO EIS leaders worked closely with ASA(ALT)'s Department of the Army systems coordinator and the deputy of acquisition systems management to keep the process moving and ensure that the required paperwork would get completed and submitted—even if somewhat later than usual.

In early March, PEO EIS received an informal approval to execute, and one month later, the acquisition decision memo was signed. PEO EIS awarded a blanket purchase agreement call order under an existing General Services Administration contract to the Air Force's systems integrator and in late spring transitioned acquisition ownership of the program from the Acquisition Innovation Directorate to PEO EIS's Defense Integrated Business Systems portfolio, where it has its own newly established product office under Keith Baylor, product lead.

"Due to the time sensitivity of the project, we appreciated the fact that ASA(ALT) placed full confidence in our recommendations and abilities," said Sherwood. "While we are meeting the undersecretary of the Army's immediate directives, we also will be applying discipline to the process by taking care of the necessary documentation and a sustainment plan."

PEO EIS leaders are optimistic about their ability to meet the Army's mandated timeline for delivering capability.

"We're very confident that we'll meet the timeline for completing the high-priority items like military tuition assistance

NEW EDUCATION
Cpl. Steve Mateo, in an internship at the education center through the career skills program, helps Master Sgt. Courtney Renee Smith navigate the ArmyIgnitED website during the ArmyIgnitED workshop held Nov. 18, 2021, at the Fort Carson Education Center, Colorado. (Photo by Norman Shifflett, Fort Carson Public Affairs)

and the rest of the capabilities in 2023," said Sherwood. "Essentially, we're conducting a real-time case study in how EIS and ASA(ALT) can collaborate to quickly address critical software acquisition problems. The approach is not without risk, but the alternatives in this case would miss the mark."

PRIORITIZING NEXT STEPS

As the new product lead for ArmyIgnitED, Baylor's priorities are to complete development of the initial capability, conduct government acceptance testing and hold the first limited deployment authority-to-proceed briefing in the fourth quarter of fiscal year 2022. As elements of the new ArmyIgnitED system are launched, the original system's functionality will gradually be shut down, though both systems will operate concurrently for a time.

There are three key milestones in PEO EIS's delivery of ArmyIgnitED:

- By the fourth quarter of fiscal year 2022, the Army is planning to deliver the minimum viable product for limited deployment of ArmyIgnitED's military tuition assistance functionality, enabling Soldiers to join and request tuition assistance. At that time, the Army also will deliver the ability to back-pay educational institutions—a process that will require data to be ingested from the original ArmyIgnitED system.
- For that first minimum viable product delivery, initial historical data will be used, and gradually more will become available for future minimum viable products that enable Army cadets to request Reserve Officers' Training Corps scholarship funding and for Army civilian training, education and professional development. Soldiers also will be able to apply for funding for credentialing assistance, a program that enables them to obtain professional credentials or licensure to enhance their careers.
- By April 2023, the Army is expected to deliver the minimum viable product for full operational capability of the system, following its tailoring to unique Army requirements. Once that initial project is complete, PEO EIS plans to continue its collaboration with the Air Force, which includes pursuing a follow-on joint contract for operation and maintenance services, as well as limited product enhancements.

CONCLUSION

Delivering a fully functional tuition assistance portal to help Soldiers and civilians achieve their educational and career goals is a top Army priority. The ArmyIgnitED project is well suited for PEO EIS's acquisition portfolio, where it can be nested with other mission-critical defense business systems and leverage existing infrastructure and processes to quickly deliver capability. Working closely with ASA(ALT), functional stakeholders, the Air Force and its industry partner, PEO EIS is committed to forging a new, expedited path to solving the Army's most pressing software acquisition challenges.

By partnering with the Air Force—something that PEO EIS is also exploring through its Army Contract Writing System and executing on select Defensive Cyber Operations projects—PEO EIS is helping enhance joint collaboration, delivering on the Army's modernization priority and ensuring fiscal responsibility.

For more information, go to ***https://www.armyignited.com/app/.***

ERIKA CHRIST provides strategic communication contract support to PEO EIS at Fort Belvoir, Virginia, as a writer and editor for Bixal. She holds an M.A. in international relations and international communication from Boston University and a B.S. in international relations from Georgetown University. She has more than 25 years of experience in both the federal government and commercial sectors.

LEVERAGING LINE-OF-SIGHT PROTOTYPES
Members of the 2nd Armored Brigade Combat Team use commercial network prototypes to enable on-the-move network communications and mission command, and more distributed operations, during a pilot at Fort Stewart, Georgia, on Feb. 7. (Photo by Amy Walker, PEO C3T Public Affairs)

FUELING NETWORK MODERNIZATION

Armored Formation-On-The-Move Network pilot informs capability-set designs.

by Col. Shane Taylor, Col. Greg Napoli and Amy Walker

Recent events in Europe and around the world are highlighting the importance of the Army's continual network modernization to ensure readiness for potential multidomain operations against near-peer adversaries. Among these priority efforts is the delivery of resilient on-the-move networking capability to armored formations. Frontline armored units combat enemy forces using a lethal combination of fire power and rapid maneuver. Improved mobile communications would greatly enhance their survivability and lethality.

To advance these efforts, the Army conducted an Armored Formation On-The-Move Network pilot—supported by the 2nd Armored Brigade Combat Team, 3rd Infantry Division—at Fort Stewart, Georgia, in January and February. During the pilot, Soldiers evaluated new and emerging commercial network technology from more than 20 industry partners integrated onto the unit's available surrogate M1068 armored vehicles. The intended platforms for future network integration include the Armored Multipurpose Vehicle and Joint Light Tactical Vehicle.

The pilot was not a formal operational test or review of potential solutions, but an opportunity for the Army to inform operational and technical concepts, requirements, technology maturity and affordability in support of the Capability Set 2025 (CS25) network modernization design.

Over the last several years, the Army has pivoted toward an iterative network modernization strategy that enables the service to rapidly design, acquire and field innovative capability equipment sets every two years. The capability-set process calls for open-systems architectures that enable easier integration of future modernization efforts, as well as systems that are more intuitive and Soldier-centric in nature. This strategy is fueling unified network modernization across Army, joint and coalition forces. CS25, which begins fielding in fiscal year 2025, will be the Army's first network capability set that includes armored formations.

HALT, PIVOT

In 2018, as the Army started to withdraw from smaller scale contingency operations, such as those in Iraq and Afghanistan, senior leaders looked ahead at the potential for larger scale combat operations against more powerful adversaries and asked some key questions: What are the principal characteristics and requirements that we would need from the network to move from a forward-operating-base-centric environment and reset to large scale combat operations in a multidomain operational environment? Are we on the right modernization path to get there?

We understood that to go toe-to-toe in a great power conflict in large scale combat operations—and win—we would need a new strategy that would enable us to more rapidly and

COMMUNICATIONS ON-THE-MOVE

Soldiers assigned to the 3rd Infantry Division conduct mission command and network communications on-the-move at Fort Stewart, Georgia, on Feb. 2. (Photo by Capt. Detrick Moore, PEO C3T)

CONVOY ENABLED
The 2nd Armored Brigade Combat Team, 3rd Infantry Division drives a convoy of satellite and line-of-sight commercial network prototypes that enable on-the-move network communications and mission command during the Army's Armored Formation On-The-Move Network pilot, at Fort Stewart, Georgia, on Feb. 7. (Photo by Capt. Detrick Moore, PEO C3T)

continually modernize our network to retain technological overmatch. The Army's former test-intensive, full capability acquisition strategy that was used for decades would not have enabled us to keep up with the increasing speed of technology. At the time, we had been fielding mobile network capability, known as Warfighter Information Network-Tactical Increment 2, integrated onto combat platforms for infantry units, and we were looking at how to design, test and integrate those capabilities into armored platforms. Although the requirements for mobile network connectivity for armored formations were still there, we temporarily halted our efforts to pivot to the new network modernization capability-set strategy.

A NEW PARADIGM

Through the Army's current network modernization capability-set strategy, we are now delivering a network that addresses critical operational shortfalls and enables future multidomain operations. Instead of delivering singular stove-piped systems across the force, solutions are now part of a suite of capabilities—with

Solutions will be Soldier-centric, drawn from feedback of Soldiers in the field.

open standards—and enable commanders to tailor capabilities to different operational environments and missions. These capability sets and associated technology are fielded on an iterative two-year basis that began with CS21 in fiscal year 2021. Each set builds on the previous set by integrating new commercial technologies, aligning Army science and technology for transition into new programs, and leveraging Soldier feedback and experimentation early and often in the process.

The iterative capability-set process enables us to deliver current and emerging network capabilities in a way that we don't disrupt our ability to "fight tonight" or maintain decision dominance on

the current battlefield. The intent is that we maintain readiness at the same time that we modernize our network.

CS21, the first of four currently planned capability sets, prioritized infantry formations, and was designed to provide smaller, lighter, faster and more flexible network communications. CS23 technologies are designed to increase network capacities and make them more resilient, and extends the network to Stryker formations. CS25 will build upon the previous capability sets and emphasizes network automation, resiliency and security, and will extend the network to armored formations.

BUILDING INTIAL REQUIREMENTS

To inform CS25 and the Armored Formation On-The-Move pilot, we conducted Soldier surveys and site visits at the National Training Center, at Fort Irwin, California—the Army's combat training center geared toward armored units—to garner initial Soldier feedback on armored formations and what they would need and want from a mobile network. To increase the efficiency and effectiveness of the pilot, we also leveraged lessons learned from our 2019 Expeditionary Signal Battalion-Enhanced pilot in support of CS21, which we conducted to inform a more mobile, lighter and scalable network-equipment set to modernize these signal formations.

Leveraging this Soldier feedback and lessons learned, and eventually collaborating closely with the pilot unit itself, we built on previous capability-set designs to drive toward our CS25 design goals. We painted an initial picture of the network capabilities we would need to enable during the armored formation pilot. These included:

- **A real-time common operational picture** to enable commanders to make more timely and informed decisions.
- **Reduction in fires processing times** to increase lethality.
- **The ability to fight while dispersed and distributed.** The Army understands that today's command posts are too big and not survivable, and in future multidomain operations the Army will have to fight with units more dispersed and distributed. The final armored-formation network equipment set will enable units and quick-halt command posts to operate decentralized and move more rapidly for improved survivability and lethality.
- **Improved network resilience**. A resilient network will enable robust uninterrupted worldwide data exchange, situational awareness, enhanced survivability and lethality during multidomain operations. Final equipment sets will provide more signal pathway options to enhance units' primary, alternate, contingency and emergency communications plans. The more signal pathway options that exist for data to travel through, both satellite and terrestrial, the more resilient the network becomes. Network communications will be transport agnostic, enabling signals to travel over various modes of network transport, such as those using other orbits, taking the optimal path of least resistance. Automatic primary, alternate, contingency and emergency communications features will switch to a better network pathway without the user's input.
- **Easy to use.** Above all, network solutions will need to be easy to use in the heat of the fight, with network complexity pulled off of the edge of the battlefield and put in the rear, where experienced signal Soldiers can manage more complex tasks.

INSIDE COMMUNICATIONS

Soldiers from the 2nd Armored Brigade Combat Team, 3rd Infantry Division communicate with the brigade headquarters from inside the network-integrated tracked vehicle at Fort Stewart, Georgia, on Feb. 7. (Photo by Amy Walker, PEO C3T Public Affairs)

EARLY AND FREQUENT ASSESSEMENTS

As part of the capability-set process and the Armored Formation on-the-Move design development, we implemented a DevSecOps process, a term frequently used in rapid, iterative software development. DevSecOps brings together the developer, the

LEVERAGING MOBILE NETWORK PILOT TO ASSESS ANTIJAM CAPABILITIES

Future multidomain operations against a near-peer threat would likely include electronic warfare, such as the ability to jam the satellite communications of U.S. forces on the battlefield. To combat these threats, the continual modernization of protected satellite communications capabilities remains a high priority for the Army.

In support of these efforts, the Army leveraged the Armored Formation On-The-Move Network pilot at Fort Stewart, Georgia, to conduct a capability excursion to inform the potential use of one of several commercial antijam capability prototypes that it has been evaluating.

Eventual antijam solutions would augment current protected satellite communications systems such as the Army's Secure, Mobile, Antijam, Reliable Tactical-Terminal (SMART-T). They could also provide additional near-term interim capability ahead of the fielding of future protected satellite systems that are in the works, like the new Air Force and Army Antijam Modem), which will be interoperable with the Space Force's Protected Tactical Satellite program.

The antijam prototype that was assessed during the pilot leverages an existing commercial waveform and corresponding modem solution that have been supporting the Army's current at-the-halt tactical network transport systems since 2004, as well as more recently fielded expeditionary early entry satellite communication systems. Because the waveform and modems are already in the field, the Army could immediately push the solution out as a software upgrade to all of the network transport configuration items across the fleet once the required certifications are granted. This would immediately and cost-effectively bring the fleet to a more resilient network baseline. The Army is exploring additional antijam capabilities for other existing fielded waveforms to bolster resilient communications in the near-term.

The antijam prototype system is in line with Army network modernization efforts to ensure systems are easy to operate, and to pull network complexity off the front lines to remote locations where they can be managed by more advanced signal Soldiers. During the pilot, the antijam capability was completely transparent to the Soldiers using their satellite communications equipment. When the managers of the prototype turned the system on from a secure remote location, the Soldiers inside the antijam protected bubble were unaware that anything had even occurred. They did not skip a beat and just went on with their fight in contested pilot environments without losing network connections.

MODES OF CONDUCT

Soldiers assigned to the 2nd Armored Brigade Combat Team, 3rd Infantry Division conduct mission command and network communications on-the-move, during the Army's three-week Armored Formation On-The-Move Network pilot, at Fort Stewart, Georgia, on Feb. 2. (Photo by Capt. Detrick Moore, PEO C3T)

Additional near-term features of the prototype solution could provide simpler network operations utility, as well as a reverse geolocation information capability that can actually pinpoint the origin location of the jamming. Units would then know if the jamming was self-inflicted by things such as closely located friendly satellite terminal emissions, or if it came from an adversary and that threat could be eliminated.

As part of the Army's capability-set strategy in support of its Capability Set (CS) 25 and CS27 resiliency and security goals, the Army used a DevSecOps approach to reduce risk before the excursion. Following multiple vendor demonstrations, the service used the integration facilities at Aberdeen Proving Ground, Maryland, working closely with its industry partner to conduct numerous laboratory-based experiments.

The Army is aware that our adversaries have the ability to jam signals. The antijam capability excursion provided a good look at what currently exists in the realm of the possible and what will be needed to support a large scale multidomain operational fight.

—John Anglin and Amy Walker

THE MEDIUM IS THE MESSAGE

First Lt. T. J. Allen communicates with the brigade headquarters from inside his network-integrated tracked vehicle at a remote location at Fort Stewart, Georgia, on Feb. 7. (Photo by Amy Walker, PEO C3T public affairs)

Soldier and the requirements community early and often in the process to ensure secure Soldier-centric designs while dramatically compressing the time it takes to deliver new equipment.

As part of this process, the team conducted risk-reduction experimentation before the pilot, at a developmental support site at Aberdeen Proving Ground, Maryland. They also used the facility to provide a regional hub node (RHN)-like capability known as the production test node during the pilot so it wouldn't disrupt real-world RHN missions. RHNs are large hubs that enable global connectivity to transport information both within theater and around the world.

During the pilot, the 2nd Armored Brigade Combat Team, 3rd Infantry Division, stressed the network equipment during realistic brigade-driven mission threads in remote training areas at Fort Stewart. Soldiers provided user feedback on three different commercial prototype equipment sets, each with varying degrees of satellite and line-of-sight capabilities. These interoperable commercial network systems included mesh network data radios, emerging on-the-move antenna and satellite communications capabilities and small, at-the-quick-halt satellite communications terminals. Leveraging commercial technology allows us to keep pace with innovation and have multiple communication pathways available for our commanders.

Soldiers also provided operational feedback on how armored formations could potentially fight with these new and emerging systems on a future battlefield. In addition, we took advantage of the opportunity to cost-effectively inform additional network modernization efforts, including antijam capabilities, signal retransmission, expeditionary next-generation satellite transportable terminals and QR codes affixed to systems that enabled Soldiers to pull up corresponding, real-time training materials on an issued tablet.

CONCLUSION

The Army will leverage both quantitative data derived from instrumentation integrated on the vehicle platforms and qualitative data, including Soldier feedback, to inform the CS25 armored formation on-the-move network designs. The Army Test and Evaluation Command was also on site and compiled

The capability set process calls for open-systems architectures that enable easier integration of future modernization efforts, as well as systems that are more intuitive and Soldier-centric in nature.

an initial report similar to a formal traditional capabilities and limitations report. In addition to informing capability-set designs, this data will also be fed to the Army capability managers to inform future armored formation network on-the-move requirements. As we look closely at the Soldier feedback and data collected during the pilot and follow-on integration and assessment efforts, we'll gain an even better understanding of what we will need to deliver in support of armored formation network modernization. Decisions such as equipment density, which vehicles should get what solutions, and the most affordable balance of satellite communications and line-of-sight for the equipment sets will all play a role.

The CS25 preliminary design review in April provided the initial design draft. Following additional assessments and Soldier touchpoint events, the CS25 critical design review will be conducted next year and will solidify the CS25 baseline capabilities to enable fielding of initial systems. In the future, the agile and incremental capability-set process will enable us to enhance that baseline if Soldier feedback warrants it or if evolving technologies become mature enough to be procured.

Solutions will be Soldier-centric, drawn from feedback of Soldiers in the field. They will increase network resiliency and the mobility, survivability and lethality of armored formations to enable successful resolution of future multidomain missions.

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

COL. SHANE TAYLOR is project manager for Tactical Network at the Program Executive Office for Command, Control, Communications-Tactical (PEO C3T). He provides the direction, management and leadership for the Army's current and future tactical communications network consisting of high-throughput line-of-sight, beyond-line-of-sight and satellite communications that enable mission command and secure reliable voice, video and data communications to Soldiers worldwide. He earned an M.S. in industrial engineering and operations management from Clemson University, an MBA from Pennsylvania State University, an M.S. in national security and resource strategy from the Eisenhower School for National Security and Resource Strategy and a B.S. in business administration from Oklahoma State University. He holds the DAWIA Advanced certification in program management, the Foundational certification in engineering and technical management, and is a certified DOD contracting professional.

COL. GREG NAPOLI is the Unified Network team lead at the Network Cross-Functional Team, Army Futures Command. The Unified Network line of effort encompasses network transport, waveforms and cyber security. Napoli is responsible for synchronizing requirements, resourcing, science and technology, market research, test and evaluation and acquisition among Department of the Army stakeholders for future network capabilities. He earned an M.S. in information technology management from the University of Maryland and an M.A. in strategic studies from the United States Naval War College, Rhode Island.

AMY WALKER has been the public affairs lead at Project Manager Tactical Network for more than 10 years and was the public affairs lead at PEO C3T for the previous two. She has covered a majority of the Army's major tactical network transport modernization efforts, including Army, joint and coalition fielding and training events worldwide. She holds a B.A. in psychology with emphasis in marketing and English from the College of New Jersey. She is a frequent contributor of photographs and articles to Army AL&T.

LET'S SEE WHAT THIS THING CAN DO
A successful demonstration of RAIL's capabilities is held in April 2021 at Anniston Army Depot, Alabama. (Photo by Mark Cleghorn, Anniston Army Depot)

MORE AGILE POWER PROJECTION

RAIL system enables offloading at austere locations.

by Chris Kieffer and Crystal Maynard

As the U.S. increases its military presence in Europe, warfighters will have a new tool that will greatly enhance their flexibility for projecting power.

Trains have long been used by military units to rapidly transport heavy equipment over great distances. However, offloading heavy vehicles like tanks and positioning them where they are needed often presents a logistical challenge. Railyards have special equipment like cranes and concrete ramps to move tanks from ground level onto the railcar and vice versa, or special configurations with tracks located on a lower plane than the road, allowing tanks to be loaded and offloaded from the back end of the train. But, these railyards are fixed facilities, making them easy targets during a conflict, and if an adversary can destroy a railyard, it can block critical logistics nodes.

Anticipating military mobility needs in Europe, a collaboration between the U.S. Army Engineer Research and Development Center (ERDC) and the Combat Capabilities Development Command Ground Vehicle Systems Center (GVSC), funded by U.S. Transportation Command (USTC), developed a new solution to address this capability gap.

The Rapidly Available Interface for trans-Loading (RAIL) is a rail ramp system that can easily be transported anywhere it is needed, allowing heavy military vehicles to be easily offloaded without the need for a permanent railyard.

"RAIL is a new, innovative capability that gives warfighters more agility and flexibility when setting up an expeditionary railhead," said Justin Strickler, division chief at ERDC's Geotechnical and Structures Laboratory.

GIRDER LIFT

Soldiers from the 757th Expeditionary Rail Center lift a girder as part of a demonstration of the RAIL system at Anniston Army Depot, Alabama, in April 2021. (Photo by Mark Cleghorn, Anniston Army Depot)

TURN PAD PLATFORM

Workers guide an M1A1 Abrams tank onto a railcar using the RAIL turn pad platform configuration during a demonstration at Anniston Army Depot, Alabama in April 2021. (Photo by Mark Cleghorn, Anniston Army Depot)

The system provides flexibility to offload heavy vehicles anywhere along a rail line, in order to keep an enemy guessing. It also allows for much quicker transport to remote locations than current methods that would require tanks to be carried by train to the nearest railyard and then driven by trucks to their final destinations, perhaps hundreds of miles away from the railyard. And if a train were to be incapacitated along its journey—such as if its tracks were destroyed—the RAIL system would still allow its cargo to be offloaded, a capability that currently does not exist. These mid-line offload points are typically along uneven terrain with minimal foundation preparation, and RAIL's ability to be used in these settings sets it apart from other market solutions.

"The problem with fixed facilities is they are easily targetable," Strickler said. "If you can only offload at point B and an adversary can stop you from getting to point B, they can stop you from transporting that equipment and ultimately accomplishing the mission."

The RAIL system contains six basic building components that can be assembled into various configurations, allowing for equipment to be offloaded from either the side or the end of the train. This sideloading capability is significant because in most cases, tanks are loaded and unloaded from the back of the train. It's a time-consuming process in which the vehicle moves along a special ramp that takes it from ground level to the back of the last railcar and then advances toward the front of the train, in a first-in, last-off configuration. If changing circumstances mean you need to offload a vehicle from one of the front railcars, the only way to get it out is by first offloading all of the vehicles behind it. With RAIL's sideloading capability, it can be set up next to any rail car and allow you to offload the vehicle directly from that particular car.

RAIL can also be used at a fixed facility as an additional offload point to give increased throughput.

A team of 16 people can set the system up by hand, and it provides flexibility to offload on a variety of terrains. Other innovations designed into the system include adjustable heights and man portability, and the ability to transport in 20-foot Conex containers. It's also small enough that it can be airdropped from a C-17 or C-130, or even transported by helicopter sling load to a location where it is needed.

> "We now have one system that offers three capabilities versus having three unique systems that only do one thing."

The system has no electronic or hydraulic parts, meaning it requires little maintenance, Strickler said. It is designed for a 20-year life cycle.

ERDC and GVSC developed the prototype through a joint research and development program by leveraging past science and technology investments and the Army labs' expertise in military bridging, structural engineering and military rail operations. The ERDC and GVSC team rapidly adopted technology it had previously developed together for offloading battle tanks at damaged seaport facilities to enable rail offloading at austere locations, away from easily targeted railhead yards.

At the request of the 21st Theater Sustainment Command (TSC), ERDC sent two prototype RAIL systems to U.S. European Command to support real-world operations. Soldiers trained on the capability at Coleman Barracks in Mannheim, Germany, from May 3 through May 10 and gave developers feedback for future iterations that will incorporate unique flexibility requirements for European operations.

WEIGHING THE BENEFITS

"The RAIL system provides the European theater a 21st century capability to improvise and build a railhead off-load [and] on-load capability at nonstandard locations," said John M. Gallagher, a supervisory traffic management specialist with the 21st Theater Sustainment Command. "This provides us a level of flexibility to adapt operational plans to enable freedom of movement and ensure speed of assembly for U.S. forces."

PRIMED FOR TRANSPORT
Soldiers at Coleman Barracks in Mannheim, Germany, demonstrated how the ramp system is configured for storage and shipping in May. The entire system fits inside a standard 20-foot container. (Photo courtesy of ERDC)

The two prototype systems will stay in Europe for training, and the 21st Theater Sustainment Command has procured funds for eight additional kits—containing the panels and beams used to construct the ramps as well as the tools that are needed to assemble them into three unique configurations—that will create operational flexibility and provide deterrence through logistical capability. Several NATO members have also expressed interest in the kits, and Latvia sent two soldiers to participate in the training.

"We are excited to have this capability in the hands of our inland cargo transfer company," Gallagher said. "The 21st TSC is indebted to the team at ERDC and GVSC for their efforts with RAIL updates, testing and evaluations."

The initial technology was developed under the Port Improvement via Exigent Repair (PIER) Joint Capability Technology Demonstration (JCTD) that developed and transitioned a solution for U.S. Indo-Pacific Command that could fix damaged piers across the globe within nine days, to enable military sealift offload. Leveraging its deep force projection expertise, ERDC collaborated with GVSC to adapt a line of communication bridge design to develop the Pier Over-Decking System, or PODS, a modular kit that can be rapidly assembled to create a roadway capable of supporting onloading and offloading on top of a damaged pier. ERDC and GVSC share a patent on the system.

In trying to discover a solution to the challenge of unloading rail cars at austere locations, the research team had the idea to apply the PODS technology in a new way, using the same basic components to create the RAIL system. ERDC was able to use its research facilities to conduct component-level testing for supporting heavy vehicle loads.

The U.S. Transportation Command sponsored the RAIL program, which was conceived in August 2019 during the final PIER JCTD operation demonstration in Earle, New Jersey, and was successfully demonstrated in April 2021, at Anniston Army Depot in Alabama.

CONCLUSION

The RAIL system is designed with the future in mind and will accommodate the heavier tanks and military vehicles that are anticipated in the years ahead. This makes the system particularly valuable, as do its flexible configurations and adaptability to other military missions like pier overdecking.

"Once additional kits and components become available, a commander would have one system capable of restoring damaged piers, unloading rail cars and overbridging under-classed bridges," Strickler said. "We now have one system that offers three capabilities versus having three unique systems that only do one thing."

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

CHRIS KIEFFER is a communications specialist with the U.S. Army Engineer Research and Development Center. He spent more than a decade as a reporter and editor with the Northeast Mississippi Daily Journal and Oxford (Mississippi) Eagle newspapers. He holds an M.A. in journalism from Columbia University and a B.A. in journalism from the University of Mississippi.

CRYSTAL MAYNARD works as a communications specialist with the U.S. Army Engineer Research and Development Center corporate communications team. She has a B.S. in public relations from the University of Tennessee and has spent almost 20 years working for various Army commands in public affairs and corporate communications.

TRUCK LOAD TRAINING
A Palletized Load System truck is loaded onto a train at Coleman Barracks in Germany. (Photo courtesy of ERDC)

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WORK BETTER TOGETHER

The capability-set process of iteratively developing the Integrated Tactical Network makes it so that Soldiers and developers are partners in making it work. (Photo by Kathryn Bailey, PEO C3T Public Affairs)

THE POWER OF SOLDIER FEEDBACK

CS23 enables Stryker squadrons to operate flexible network and situational awareness capabilities from inside the hull out to the area of operations on the ground, thanks to Soldier feedback from CS21.

by Matt Maier, Lt. Col. John Judy and Kathryn Bailey

Just three short years ago, the Army began implementing its capability-set process as a means to deliver better network capability to Soldiers. Beginning with Capability Set (CS) 21, the Army focused on providing Integrated Tactical Network (ITN) capabilities to multiple infantry brigade combat teams, beginning with the 82nd Airborne Division.

Fast forward to CS23, which is the latest iteration of the Integrated Tactical Network, now fielding to squadrons within the 2nd Cavalry Regiment in Germany. Where CS21 provided dismounted network capabilities to multiple infantry brigade combat teams, the addition of CS23 enables Stryker squadrons to operate flexible network and situational awareness capabilities from inside the hull, out to the area of operations on the ground.

The Army adopted the CS process to standardize what network capabilities get fielded, by first conducting a preliminary design process one year in advance of the critical design review, which locks in a baseline. In between these two events are exercises, Soldier touch points and a comprehensive technical test with oversight from the Army's test community.

For the first time, three iterations of the Army's network capability set process are concurrently in motion. These iterations feature the final CS21 fielding to the 4th Infantry Brigade Combat Team, 25th Infantry Division, which was recently activated as the 11th Airborne Division to posture U.S. forces for strategic advantage in Alaska's harsh arctic terrain. They also include current CS23 fielding to the 2nd Cavalry Regiment and the 101st Airborne Division, which is the first divisional capability set fielding and initial network design efforts with armored formations for CS25.

CS23 ROLLS INTO THE FIREFIGHT

For now, all eyes are on CS23 and integrating the Integrated Tactical Network into the 2nd Cavalry Regiment's Stryker vehicles.

A recently completed live-fire training event in Vilseck and Grafenwöhr, Germany, brought Soldiers, program developers and evaluators together to assess and measure the operational effectiveness, suitability and survivability of CS23's Integrated Tactical Network, including cyber capabilities, as part of its Operations Demonstration (Ops Demo) Phase 1 with the unit. The 3rd Squadron, 2nd Calvary Regiment came together with the Program Executive Office for Command, Control, Communications-Tactical (PEO C3T), the U.S. Army Combat Capabilities Development Command C5ISR Center and the Army Test and Evaluation Command.

PEO Ground Combat Systems (GCS), which continues to provide a critical partnership to CS23 and beyond, mounted and integrated components of the Integrated Tactical Network into the vehicle.

Ops Demo Phase 1's live-fire mission was a smaller scale demonstration, which provided opportunities for the unit to test the radios and devices from both inside and outside the vehicle. For this event, the unit used the Integrated Tactical Network 's PRC-163 Leader Radio for dismounted operations and the PRC-162 Manpack radio for both dismounts and inside the vehicles to communicate across the squadron.

EMPHASIS ON INTEGRATION

Army developers are now taking lessons learned from the event to prepare 2nd Cavalry Regiment for its Combat Training Center rotation in early 2023, called Dragoon Ready. The exercise will feature multiple squadrons in a large-scale operational force exercise, which will push the boundaries of the network even further to help the Army make a good fielding decision based on the results of that exercise.

FIELD TESTED

Ops Demo Phase 1's live-fire mission allowed Soldiers to test radios and devices from inside and outside the Stryker vehicles. (Photo by Kathryn Bailey, PEO C3T Public Affairs)

The Integrated Tactical Network provides a simplified, independent, mobile network solution comprising a commercial solutions kit that can be rapidly inserted into the existing tactical network. These capabilities provide commanders with flexible, secure and resilient communications across echelons and will be pivotal to 2nd Cavalry Regiment's mounted, highly mobile missions as part of their arsenal within the European Command area of operations.

"The biggest thing about ITN is that it is truly an integrated tactical network," said Staff Sgt. John Mock, 3rd Squadron, 2nd Calvary Regiment network communications officer-in-charge of network integration for the unit. "We aren't using independent systems that are great on their own but ultimately don't talk to one another."

MIND MELD

Soldier touch points provided critical feedback for the Army's test community. (Photo by Spc. Ryan Parr, Training Support Activity Europe)

With the addition of CS23 Integrated Tactical Network capabilities, Soldiers are able to access cellular hotspots for their vehicles, which allow mounted Soldiers to connect to cloud-based resources with a secure VPN over host-nation cellular services as part of their primary, alternate, contingency and emergency plan.

CS23's Integrated Tactical Network also provides new Wi-Fi and updated GPS vehicle routing capabilities, and multiple-input and multiple-output radios, which allow high-speed data exchanges in both static and mobile command posts.

Radios are the primary capability used for Integrated Tactical Network communications across the echelons, and for this exercise, the 2nd Cavalry Regiment "Wolfpack" platoons used the PRC-163 Leader Radio for dismounted operations and the PRC-162 Manpack radio for both dismounts and inside the vehicles.

"The ITN is turning the corner on line-of-sight radios, going back to post-Vietnam, so that now we are able to transmit in and around terrain and armored vehicles," said Sgt. Maj. Christian Bearden, who is in charge of all operations processes and establishing the main command post. "If the radio is the most casualty-producing weapon on the battlefield, we must have a radio that provides the capabilities that we need."

The radios are connected to the Nett Warrior—a handheld, cell-phone-like device—providing real-time, map-based position location information to Soldiers across all echelons.

"With the ITN, we gain more [position location information] and thus more survivability," Bearden said. "That is a game changer for us."

The primary waveform used with the Integrated Tactical Network is the TSM waveform, which is a commercial mesh waveform that requires line-of-sight and provides a multinode relay, where every radio is a repeater for all network traffic. Providing simultaneous voice, data and position location information, TSM operates in the secure but unclassified network environment, which enables encrypted data to be transmitted over military or commercial networks, the internet, cellular networks or compatible but non-military waveforms.

The 3rd Squadron, 2nd Calvary Regiment initially received CS21 Integrated Tactical Network as a means for the unit to train on the radios and handheld devices, which they used during the multinational exercise Saber Strike 22 conducted in February.

"We conducted a 14,000-kilometer road march from Germany to Latvia," Bearden said. "You're not going to see that with any [continental United States] organization.

CALLING ALL UNITS
The PRC-162 Manpack radio and PRC-163 Leader Radio for dismounted operations at work during the exercise. (Photo by Kathryn Bailey, PEO C3T Public Affairs)

It provided a great perspective about how ITN communications works and how we were able to communicate across long distances while making a large-scale movement."

Unit leaders compared using CS21 versus CS23 in their recent live-fire exercise. "Between our initial CS21 Integrated Tactical Network fielding and CS23 Ops Demo, the key points we brought up, whether large-scale problems or small, such as placing a button in a certain place, have been implemented," Mock said. "We see noticeable improvements between the two, that are benefiting us."

One area identified for additional improvement during Ops Demo 1 was power requirements for the Strykers under certain operational conditions; specifically, the unit could not maintain power during the silent watch portion of the exercise where the Strykers shut off engines and run on batteries while doing night operations. Leaders and developers are working with PEO GCS to incorporate these lessons learned, with the understanding that integrating modern equipment onto the unit's legacy flat-bottom Strykers could result in power issues. Future capability-set fieldings planned with other units take this issue into account, and the Integrated Tactical Network will be integrated into more modern vehicles.

The capability-set team will continue to work with the 2nd Cavalry Regiment to identify potential options using legacy vehicles.

TRAINING WITHOUT END

Throughout the CS21 and CS23 fielding, the 3rd Squadron, 2nd Calvary Regiment has received new equipment training from PEO C3T. Because of this support, the unit has been able to conduct its own training and troubleshoot network equipment when needed.

"My Soldiers were in five months of solid classes and actively working with the equipment to learn it from the inside out," Mock said. "We've gotten to the point where we're less reliant and dependent on the field service representatives. We can handle the technical issues ourselves."

The leadership and development teams under PEO C3T have learned holistically that by applying those training lessons learned from CS21 into CS23, Army schoolhouses must be brought in to begin institutionalizing training across the force as more units continue to receive capability set fielding.

However, institutionalized training is not limited to the units receiving the full network kit. More than 300 additional units have or will have specific components, such as radios, that are referred to as capability-set-enabling equipment. These units still require the appropriate equipment training to enable communications and information sharing across formations.

Soldier feedback is making a difference institutionally, not only with technology, maturity and operational relevance, but also with guidance on how Soldiers should receive initial and refresher training.

CONCLUSION

The capability-set process has turned the old way of technology development and fielding upside down. In the case of CS23, it is no longer acceptable to hand a kit over to a platform unit and tell them, "This is your network; make it fit in your vehicles."

MORE POWER

Ops Demo 1 identified that, under certain conditions, Stryker vehicles' power requirements need additional improvement. (Photo by Spc. Ryan Parr, Training Support Activity Europe)

Only by working with the unit from the beginning of the process to assess how they conduct operations, what technologies will enhance the success of the operations and what will fit in small spaces, could Integrated Tactical Network have been integrated into Stryker vehicles. As the multi-organization capability-set team continues to address lessons learned from Ops Demo Phase 1, they are actively preparing for Ops Demo Phase 2, which will include a greater cyber component, featuring a red team to test the unit's systems to prevent adversarial access.

As a critical precursor to CS25, which will integrate the Integrated Tactical Network for armored brigade combat teams, CS23 is helping to refine the unique network and communications needs of on-the-move operations. For now, equipping the unit in charge of full spectrum operations throughout the European Command's area of responsibility with the latest ITN iteration remains a critical and timely priority.

For more information, go to ***https://peoc3t.army.mil/c3t/****.*

MATT MAIER is the project manager for Interoperability, Integration and Services at PEO C3T, where he oversees multiple network modernization product manager organizations and the development and integration of the Army's network capability sets. He has an M.S. in systems engineering from George Mason University and a B.S. in electrical engineering from Virginia Tech. He is also a graduate of the Senior Service College Fellowship program from the Defense Acquisition University and holds certificates in computer, information, and software intensive systems from George Mason University.

LT. COL. JOHN JUDY is the product manager for capability-set development, assigned to the Project Manager for Interoperability, Integration and Services at PEO C3T, and is responsible for ensuring all the different systems work together as one grand tactical network deployed to the unit from an architectural perspective. He holds an MBA in system acquisition management from the Naval Postgraduate School and a B.S. in computer science from the University of Georgia. His military training and education include the Army Airborne School, the Armor Officer Basic Course, the Scout Platoon Leader's Course, the Signal Captain's Career Course, the Recruiting Commanders Course, Naval War College, Acquisition Officer Basic and Intermediate Qualification. He holds the DAWIA Advanced certification in program management, and Foundational certification in engineering and technical management. He also holds Advanced certification in program management.

KATHRYN BAILEY is a public communications specialist for Bowhead Business & Technologies Solutions, assigned to PEO C3T. She is the lead public affairs representative for Project Manager Tactical Radios and Product Manager Capability Set Design, under Project Manager Interoperability, Integration and Services. She has a B.A. in communications studies from the University of Maryland. She is a regular contributor to Army AL&T.

RAPID RELAY
Strong partnerships among organizations allow the rapid incorporation of Soldier feedback for Nett Warrior upgrades. (Photo by Justin Sweet, PEO Soldier)

THE BIG PICTURE

When used together, Nett Warrior and the ENVG-B's common operating picture provide Soldiers overmatch against adversaries.

by Frederick Shear and Jason Amadi

Nett Warrior and the Enhanced Night Vision Goggle-Binocular (ENVG-B) are examples of evolving programs that integrate new capabilities in existing platforms rapidly.

Nett Warrior leverages commercial smartphones with tactical applications networked through radios to provide Soldiers greater situational awareness. It allows for fast, accurate decisions in tactical engagements. Deployed to Iraq and Afghanistan over the last decade, the system can map and display on a smartphone the location of friendly and enemy forces, targets and terrain points.

Mounted on a Soldier's chest, connected to their Improved Outer Tactical Vest or Modular Scalable Vest, this situational awareness system consists of a smartphone, Android Tactical Assault Kit (ATAK) software, chest mount and radio.

UPGRADES UPGRADED

Nett Warrior developed out of the Land Warrior program as the Army sought to provide dismounted Soldiers a fuller picture and real-time understanding of their surroundings while donning less cumbersome equipment. Since 2012, the Army has fielded six versions of Nett Warrior and more than 23,000 systems. The ability to take Soldier feedback and quickly incorporate it into a more advanced system has been a hallmark of the program since its inception.

The Army started delivering the most current Nett Warrior in July 2021. This version features a Samsung S20 as the phone (an upgrade from the S7 used previously), a Dock-Lite mounting system and wireless network connections that eliminate the need for bulky cables to connect to a radio.

The Army has provided 3,800 systems to the combat force to date and will deliver 8,200 to units over the next several months.

SOLDIER-CENTERED DEVELOPMENT

Lt. Col. Denny Dresch, the product manager for Ground Soldier Systems, noted how the Nett Warrior features a modified commercial-off-the-shelf device, which allows the Army to quickly find and procure solutions to meet Soldier needs.

Strong partnerships among several Army organizations foster an environment that allows for the rapid incorporation of feedback and acquisition and delivery of Nett Warrior upgrades.

"When we get Soldier feedback, whether from a Soldier touch point or operational assessment, we take our lessons learned and begin to iterate for system-of-systems improvement using a test-fix-test methodology," said Dresch. The product manager shop, Dresch explained, conducts such events at several venues, including the Soldier Integration Facility at Fort Belvoir, Virginia, the C5ISR Center at Aberdeen Proving Ground, Maryland, and the Electronic Proving Grounds at Fort Huachuca, Arizona.

The Program Executive Office (PEO) for Soldier also works closely with the PEO for Command Control Communications - Tactical (C3T) and its project manager for tactical radios to maintain interoperability standards on Nett Warrior systems.

COLLABORATION FOR FUNCTIONALITY

Nett Warrior's capabilities have expanded through its synchronization with the Army's Integrated Tactical Network. The Integrated Tactical Network is an approach that introduces innovative commercial components and network transport capabilities into the tactical network environment. By inserting commercial capabilities, Soldiers are operating a simplified, independent network solution that is modern and provides enhanced, flexible network availability at the brigade level and below.

The network's commercial components include several varieties of software-defined tactical radios, including both single-channel radios and two-channel leader radios, tethered drones, small satellite terminals and commercial phone technology. Its radios communicate using the Tactical Scalable Mobile Ad-hoc Network (TSM) waveform, which forms a mesh network the Army calls a communications "bubble" for all the formations that need to communicate. Using TSM in conjunction with a tethered drone—a drone with a single channel radio affixed to it—can provide an extended network of up to 20 kilometers.

By integrating Nett Warrior with the Integrated Tactical Network radios, commanders achieve a consolidated air, ground and fires picture into a single common operating picture.

During several exercises in 2021 and 2022, paratroopers with the 1st Brigade Combat Team, 82nd Airborne Division at Fort Bragg, North Carolina, have used their Integrated Tactical Network radios and Nett Warrior devices to provide their commanders with position location. Commanders have reported immediate 90 percent accountability before exiting the drop zone to execute their mission.

One key change the Integrated Tactical Network brings to the Army's tactical network is the ability to operate over the secure-but-unclassified security enclave, which allows Nett Warrior to use a mixture of military and commercially available networks. By adding a secure-but-unclassified enclave to the Army's commercial national security algorithm, Soldiers using Nett Warrior are no longer restricted to communications across a single-path transport. Multiple pathway options allow the generation of a more robust primary, alternate, contingency and emergency plan when Soldiers encounter contested or congested environments. The secure-but-unclassified enclave also allows data to be categorized in accordance with its classification. Because the majority of tactical information below the battalion level is time-sensitive, perishable and unclassified, such as position information location during mobile missions, the secret network is not necessarily optimal in all operating conditions.

MID-TIER MAKES GOOD

In late 2018, to rapidly field commercial network capability to priority units, the Army, through PEO C3T and PEO Soldier, formed a team of acquisition professionals to develop an acquisition strategy, procurement and test plans and production strategy for the Integrated Tactical Network effort. The Army

The ability to take Soldier feedback and quickly incorporate it into a more advanced system has been a hallmark of the program since its inception.

acquisition executive (AAE) designated the project manager tactical radios as the office of primary responsibility.

The AAE then granted middle-tier acquisition authority for both prototyping and fielding to the project manager radios team, ultimately assuring Integrated Tactical Network fielding within five years of its approved requirement. The plans that led to mid-tier acquisition are now an example across the Army. In less than two years, the team took ITN from concept to reality, and procured capability for fielding in the 2021 fiscal year.

The mid-tier pathway "enabled [the tactical radios program office] to rapidly prototype commercial technologies using an abbreviated requirement document and gain Soldier feedback to continually enhance the capabilities and inform Army design and fielding decisions," said Jerry Harper, the product manager for Helicopter and Multimission Radios, at PEO C3T.

RAPID ACQUISITION

Nett Warrior interfaces with the ENVG-B to allow the Soldier to receive and display augmented reality navigational, targeting and situational graphics on the ENVG-B. The augmented-reality technology delivers heads-up situational awareness in the ENVG-B for tactical and training situations when used with Nett Warrior. Rather than looking down at a 2D map or smartphone, the Soldier sees virtual icons overlaid on their real-world view in real time. Navigation, known friendly and enemy locations, targets and orientation in a given area are all broadcast directly to a Soldier's field of view.

The ENVG-B is a helmet-mounted individual night-vision device with an integrated long-wave infrared thermal sensor and

SPOT CHECK

A Soldier checks his Nett Warrior during an Army Expeditionary Warrior Experiment force-on-force field demonstration held on Fort Benning, Georgia, in March. Nett Warrior uses smartphones with tactical applications networked through radios to provide better situational awareness to Soldiers. (Photo by Jason Amadi, PEO Soldier)

By integrating Nett Warrior with the Integrated Tactical Network radios, commanders achieve a consolidated air, ground and fires picture into a single common operating picture.

high figure-of-merit white phosphorus, dual image-intensification tubes. A fused thermal and image intensification image is displayed in high definition. The infrared sensor detects heat and can be used during low- and high-light levels, extreme weather and with obscurants. The ENVG-B is interoperable with the Family of Weapon Sights-Individual for rapid target acquisition that provides the Soldier the ability to accurately engage targets without shouldering the weapon.

The ENVG-B program began in December 2017 with the approval of a directed requirement to deliver this critical capability to Soldiers. Leveraging an urgent-capability acquisition strategy, the first ENVG-B systems were fielded to Soldiers of the 2nd Brigade, 1st Infantry Division in September 2019.

"Our team worked closely with our partners at the Soldier Lethality Cross-Functional Team to expedite the staffing of the directed requirement and Army Contracting Command-Aberdeen Proving Ground to develop a contracting strategy to support the rapid procurement of the ENVG-B," said Lt. Col. Melissa Johnson, the product manager for Soldier maneuver sensors. "Without the exceptional support of both of those teams, we wouldn't have achieved the critical milestone of placing the first ENVG-B system into the hands of Soldiers in such a short period," said Johnson.

PRODUCTS EXPEDITED

PEO Soldier's partnership with the ENVG-B's primary contractors, L3 Harris and Elbit Systems America, was another one of the key aspects of expediting the program timeline. With their help and flexibility through the pandemic, PEO Soldier met major production and delivery milestones.

Working to deliver the same system, L3 Harris and Elbit Systems America resourced production lines to maximize efficiency and remained flexible to the many challenges presented during the pandemic. For the ENVG-B directed requirement, L3 Harris delivered the 10,000th ENVG-B this past April and Elbit delivered ENVG-B systems to support continued production qualification testing. These were significant achievements by the team and were directly influenced by the level of effective and consistent communication across all teams.

BETTER TOGETHER
Soldiers can receive and display augmented reality, targeting and situational graphics on the ENVG-B when it interfaces with Nett Warrior. (Photo by Courtney E. Bacon, PEO Soldier)

Similar to L3 Harris and Elbit, the entire PEO Soldier team faced challenges during the pandemic and had to rely on the dedication of its staff to meet various challenges in delivering the ENVG-B. Even through the pandemic, the Soldier Lethality Cross-Functional Team and PEO Soldier conducted 16 Soldier touch points

NETT BENEFIT

A Soldier uses the Enhanced Night Vision Goggle-Binocular, Nett Warrior and Family of Weapons Sight – Individual during a full mission test and Soldier touch point at Aberdeen Proving Ground, Maryland, in February 2021. (Photo by Justin Sweet, PEO Soldier)

throughout ENVG-B development to inform the final design of the system and ensure user acceptance. To date, the ENVG-B program has fielded more than 9,000 ENVG-B systems to eight brigade combat teams across the Army.

"All teams face challenges, but I think how we react to those challenges is what really makes a team proficient. We faced limitations early in terms of travel and the maximum telework policy, however, we were able to work with the primary contractors to develop innovative techniques to achieve deliveries," Johnson said.

"One example was the virtual product acceptance, where our team and the in-plant Defense Contract Management Agency quality assurance representative inspected systems virtually to support shipment and subsequent fieldings of the ENVG-B systems. Our team at PEO Soldier did an exceptional amount of work. They showed sheer dedication, patience and perseverance. They're true professionals. They moved forward through that period of uncertainty with pride and a great attitude. You couldn't ask for a better team of professionals," Johnson added.

CONCLUSION

Individually, Nett Warrior, the Integrated Tactical Network, and ENVG-B are great capabilities. However, when used together, they provide unmatched situational awareness capability to our combat formations that improves mission planning, communication and decision-making at the Soldier and squad level. The common operating picture delivered by this system of systems provides our Soldiers overmatch against peer and near-peer adversaries. These enhanced capabilities are invaluable in any current or future operational environment.

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

FREDERICK SHEAR is a communications specialist providing PEO Soldier Project Manager Integrated Visual Augmentation System (PM IVAS) public affairs support on behalf of TMGL LLC. He also serves as a major in the U.S. Army Reserve.

JASON AMADI is a communications specialist providing PEO Soldier PM IVAS public affairs support on behalf of Janson Communications.

OMAR SIAJE

COMMAND/ORGANIZATION: Program Executive Office Combat Support and Combat Service Support, Product Manager Force Projection, Product Manager Petroleum and Water Systems (PAWS)

TITLE: Assistant product manager

YEARS OF SERVICE IN WORKFORCE: 18

DAWIA CERTIFICATIONS: Advanced in program management and life-cycle logistics

EDUCATION: MBA, business administration and management, Wayne State University; B.S. in management information systems, Wayne State University; A.S. in technical design, Henry Ford College

AWARDS: Commander's Award for Civilian Service (twice); Bayonet Award

THE BIGGER PICTURE AND BEYOND

Making decisions, according to Omar Siaje, sometimes means it's important to pause, tap into all available resources and consider the bigger picture—because decisions made now will affect how things are done in the future.

"In my role as an assistant program manager, I make decisions on a daily basis and seek out information from my subject matter experts to help me make those decisions," Siaje said. "I support and manage efforts for initial development, prototype development, testing, production, logistic product development, fielding and disposal, while vigorously managing costs, schedules and performance." While he takes pride in that, he added, "I take even greater pride in improving a process or function or helping others improve their acquisition programs."

Siaje is based at the Program Executive Office for Combat Support and Combat Service Support (PEO CS&CSS) in Warren, Michigan. Most of his friends have jobs in the automobile industry, and when he describes his role to them, they're surprised at the similarities between how their business operates and how Army acquisition operates.

While their jobs are similar, he said, they often don't realize that "military hardware and software usually find their way into the auto industry—like sensors, GPS, night vision and sonar ranging have all improved designs for the auto industry even though they were first developed for a military application."

"A very close friend of mine got a job as an [acquisition] engineering intern and suggested that I apply. Approximately a year later I was hired as a supply intern," he said. "My first few years were spent managing inventory levels, buying and repairing spare parts… and learning how the Army works. My next assignment was as an integrated logistics manager." The job was eye-opening. "I was a witness to a completely different side of the business."

Siaje said a few years later he transitioned into program management and has been there ever since. "The work in a PM [product manager] office is ever evolving and there are new challenges that arise every day, which makes working in program management very exciting," he said.

"The work in a PM office is ever evolving and there are new challenges that arise every day, which makes working in program management very exciting."

BRACING FOR IMPACT

The Mobile Tactical Retail Refueling System (MTRRS) braces for impact during production qualification testing at Aberdeen Test Center on Jan. 7, 2021. Siaje was assigned as an assistant product manager for Petroleum and Water Systems in February 2017, where he launched the development of the MTRRS. (Photos courtesy of Aberdeen Test Center, Aberdeen Proving Ground, Maryland)

JOY RIDE

The MTRRS enjoys a ride on the back of the M1083 Truck and M1095 Trailer during a production qualification test at Aberdeen Test Center on Jan. 7, 2021. Siaje worked on the MTRRS for five years, while he was at Petroleum and Water Systems.

During his career, Siaje that said he has participated in major and minor acquisition programs, but that acquisition category (ACAT) III programs, for an assistant product manager, can be more challenging since ACAT I programs may have several assistant product managers, each managing a piece of the program. ACAT III teams are much smaller and the assistant product manager oversees development of the entire program. He said an assistant program manager overseeing an ACAT III program "must be well versed in all facets of the defense acquisition life cycle to include such disciplines like design and engineering, testing, logistics and fielding."

In addition to these programs, more recently, he completed the Civilian Education System – Advanced Phase 1 course designed for Army civilian leaders who exercise direct leadership to effectively lead and manage teams. He said the course taught him a lot about being an effective leader within the Army Acquisition community, and he's looking forward to taking the Phase II course in the near future.

Siaje is more than happy to share his experiences and lessons learned to help colleagues in any way that he can. Recently, he offered some advice to a new intern. "I was appreciative of him and noticed that he was really engaged with the rest of the team, which I did not expect from an intern. Afterwards, I approached him to express that appreciation and, throughout our conversation, I discovered that his work ethic was surprisingly high." To his surprise, Siaje said that the intern "responded by asking me to be his mentor, which I was humbled to accept."

Siaje was recently promoted to program officer, acquisition, for the PEO CS&CSS Joint Program Office – Joint Light Tactical Vehicle Systems Integration. While he's "still getting acclimated," his mission there is to lead the integration of existing and emerging systems onto the Joint Light Tactical Vehicle.

Of all the lessons Siaje has learned throughout his career, "seeing the bigger picture" is the most important one. "Many times I was baffled by a decision made that would affect something that I was directly involved with. Understanding that the Army has priorities and limited resources is always part of the equation," he said. "Sometimes, it just helps to take a step—or even a few steps back—to see the bigger picture and only then do things make a bit more sense."

—CHERYL MARINO

MULTIPURPOSE SUPPORT
Family of Medium Tactical Vehicle (FMTV) M1078 2.5-ton cargo vehicles are capable of operating worldwide across various terrains and in extreme weather conditions. (Photos courtesy of PEO CS&CSS)

DRIVING CHANGE IN DEFENSE ACQUISITION

Lessons learned from applying flexible source selection tools and processes to the procurement of a commercial tactical-vehicle hybridization solution.

by Charles Park

The Department of Defense is the largest consumer of fuel in the world. This high consumption is driven in part by the needs of DOD vehicles, which spend 75 percent of their operational time idling in order to power necessary onboard electrical systems (e.g., radios, command-and-control systems, electronic warfare systems, etc.) and help maintain cabin climate control. However, this results in significant fuel consumption while the vehicle is stationary. Estimates indicate that tactical vehicles can burn from 30 percent to 60 percent of their fuel while stationary, during the course of normal use. This reduces vehicles' range, burdens operational logistics chains and creates significant costs for DOD.

But what if these vehicles could be hybridized? How much fuel could DOD save? How much would that impact the logistics chain? The U.S. Army and the Defense Innovation Unit (DIU) are determined to find out.

LEVERAGING COMMERCIAL TECHNOLOGY

In 2021, the U.S. Army's Project Manager (PM) for Transportation Systems, part of the Program Executive Office for Combat Support and Combat Service Support (PEO CS&CSS), sought out DIU to pursue tactical vehicle hybridization.

DIU is the only DOD organization dedicated to accelerating the adoption of dual-use technology and it partners with organizations across DOD to rapidly prototype and field advanced commercial solutions that address national security challenges.

Aware of the commercial sector's effort to convert its fleets of long-haul, emergency and recreational vehicles into hybrids, PM Transportation Systems is focused on bringing hybrid vehicle capability to the U.S. military to improve vehicle fuel economy, increase tactical range and minimize logistical strain.

To get the latest, best-of-breed technology into warfighters' hands, speed and agility are paramount to maintain a competitive advantage over our adversaries. DIU developed the

commercial solutions opening process in 2016, which is based on other-transaction authority, to competitively prototype and acquire dual-use technology from nontraditional vendors faster than the traditional contract process, which can take more than 18 months. The commercial solutions opening process satisfies the competitive requirements for other-transaction agreements while providing maximum flexibility in making initial and follow-on (i.e., scalable) award selections.

Furthermore, the commercial solutions opening intentionally mirrors commercial acquisition methods, as opposed to traditional approaches under the Federal Acquisition Regulation (FAR), to quickly vet and select technologies that provide value to DOD.

TACTICAL VEHICLE HYBRIDIZATION: A CASE STUDY

To kick off the search for viable, commercial hybridization solutions, DIU posted a solicitation to its website in April 2021. After 115 days and 23 vendor proposals submitted, DIU then issued a prototype other-transaction award to two nontraditional defense contractors—XL Fleet and Volta Power Systems. Six months later and with new funding, DIU awarded two additional prototype other-transaction agreements to nontraditional defense contractors Blackburn Energy and Stealth Power. Not only did DIU exercise flexibility in contracting by issuing multiple awards in a seven-month span, but the awards are also currently meeting all of the technical requirements and all phased milestones. The team estimates that these four solutions can yield approximately 20 percent fuel savings.

But what factors contributed to successfully awarding these prototype contracts? And what lessons can be gleaned for the broader DOD contracting community?

ONGOING AND FREQUENT COMMUNICATION

Ongoing and frequent communication among DIU, PM Transportation Systems and the prospective vendors allowed DIU to issue timely prototype other-transaction agreements for the hybridization project. Specifically, consistent government-vendor syncs helped to ensure that revisions to the statement of work and the terms and conditions did not impact the award schedule.

Maintaining open lines of communication enabled the teams to anticipate potential issues and prevent or mitigate them. For example, early integration of legal and policy personnel can help to mitigate potential disagreements. Similarly, opening the line of communication between the DOD prototyping partner, PEO CS&CSS and the prospective vendors allows the team to anticipate high-level interests (e.g., funding sources) and quickly make adjustments, especially if there is personnel turnover, to ensure a smooth execution. In the case of the hybridization commercial solutions opening, the DIU program manager set a manageable but fast-paced timeline. The DIU program manager was involved in each step of the process, scheduling and attending meetings to keep things running smoothly.

OTHER-TRANSACTION STATUTES

There are numerous misconceptions around the other-transaction authority—one of them being that it is not a legal acquisition method. In fact, such transactions have been a statutorily authorized procurement tool since the 1960s. Today, other-transaction agreements come in many "flavors," as detailed below. DIU primarily awards prototype other-transaction agreements.

10 U.S.C. §4021: RESEARCH & DEVELOPMENT OTHER TRANSACTION

Basic, applied and advanced research projects. Spur development of advanced technologies that may have commercial or military application (usually cost sharing).

10 U.S.C. §4022: PROTOTYPE OTHER TRANSACTION

Prototype projects that are directly relevant to enhancing the mission effectiveness of military personnel and the supporting platforms, systems, components or materials proposed to be acquired or developed by the Department of Defense, or to improvement of platforms, systems, components or materials in use by the armed forces.

10 U.S.C. §4022(F): PRODUCTION OTHER TRANSACTION

Allows for a noncompetitive, follow-on other transaction to a prototype other-transaction agreement that was competitively awarded and successfully completed.

TRANSPORT MODE
The M1087 Expandable Van Shelter provides a highly mobile workspace for logistics support, maintenance, command-and-control and other functions.

FLAT TEAMS FACILITATE COLLABORATION

Contract awards do not flow through a single individual. Rather, they are the result of a dynamic process that spans multiple stakeholders. The government team that executed the hybridization other-transaction agreement included a DIU agreements officer (a contracting officer for other-transaction agreements), an acquisition chief, a DIU program manager, a representative from PM Transportation Systems, an agreement officer representative, legal counsel, policy experts and other supporting personnel. These stakeholders need to work together on all aspects of other-transaction execution. What is noteworthy about the government team is its nonhierarchical nature. Having a flat team helped ensure that all parties had a shared sense of responsibility and were responsive to one another when it came to defining and refining the problem, determining whether the other-transaction authority is the appropriate award instrument, deciding how to publicize and solicit sources and developing the other-transaction agreement itself. Most DOD organizations have a formal legal review process that can take more time. At DIU, the agreements officer is able to contact DIU legal counsel directly and discuss potential legal issues as they occur, limiting potential delays. Moreover, throughout the hybridization commercial solutions opening, the agreements officer worked in parallel with the DIU program manager; the lead DIU program manager focused on technical requirements while the agreements officer concurrently negotiated other-transaction terms and conditions and pricing with companies.

"Teamwork has been excellent," said Jack Johnson, chief technology officer and co-founder of Volta Power Systems. "I've been impressed with the team's ability to work together (and) capture issues, (the) speed of resolution and excellent communication around technical details."

PRACTICE TRANSPARENCY TO BUILD TRUST

Not all DOD partners are alike when it comes to their level of experience with other-transaction agreements. Some partners are super users while others are new adopters. Similarly, some industry partners, especially nontraditional defense contractors, may not have experience working with DOD. As such, the agreements officer must often act as both an educator and an honest broker by setting realistic expectations around timelines and reaching an agreement around the required level of intellectual property rights.

Under commercial solutions openings and other transactions, the government may often partner with industry to a greater extent than it would under a typical FAR-based source selection, making it an ideal way for small and first-time contractors to get their foot in the door with DOD. During the hybridization commercial solutions opening, the DIU team worked closely with both industry and DOD partners to help educate them on the nuances of the other-transaction contracting process. The DIU team also shared advice on how to achieve equitable intellectual property terms that balance the companies' need to protect their data rights with the government's need for essential

To get technology into warfighters' hands, speed and agility are paramount.

CARRYING THE LOAD
The Family of Medium Tactical Vehicles A2 fleet performs a range of duties, from supporting combat missions and relief efforts, to logistics and supply operations.

information that will inform future decisions and save taxpayer dollars in the long run.

LEARN TO SPEAK COMMERCIAL

Traditional contractors that work with DOD on a regular basis are considerably different from those that work primarily in the private sector. Today's contracting officers are taught about FAR-based contracting principles, policies and procedures, but most have limited experience in commercial contracting and private industry best practices. Defense program and contracting managers must constantly evaluate existing and rapidly changing industry products and services, but this is mostly limited to the government's traditional contractors. Nontraditional enterprises creating innovative technology for commercial or nondefense markets may be excluded.

DOD program and contract personnel at all levels must learn to apply strategic and tactical market research approaches from private industry on a continual and routine basis. Existing commercial best practices and market research tools must be re-disseminated and re-emphasized to DOD acquisition personnel. We must all learn to value market research in order to accomplish the short-term results as well as the long-term program acquisition plans required by DOD to attain technological and mission superiority. Understanding who they are, where they are and what motivates them, is critical for establishing criteria and acquisition strategies that will attract nontraditional contractors.

DIU's hybridization program manager—who led the negotiation—had substantial commercial electric vehicle working experience, and the agreements officer has worked on several non-FAR, commercial contracts. The members of the DIU team were also current or former military officers. Collectively, these experiences gave the team unique insights into both sides of the agreement process and helped build an equitable contract for all parties.

PLAN FOR FOLLOW-ON ACTIVITIES

DIU's acquisition best practices highlight that government teams should plan for follow-on work for prototyping and production contracts from the beginning of prototype projects. This allows for potential scaling of successful efforts to a broader adoption of these emerging technologies. For the hybridization project, follow-on production and scaling were planned early on. Specifically, follow-on production requirements were listed in the original solicitation, as well as the statement of work and the terms and conditions.

CONCLUSION

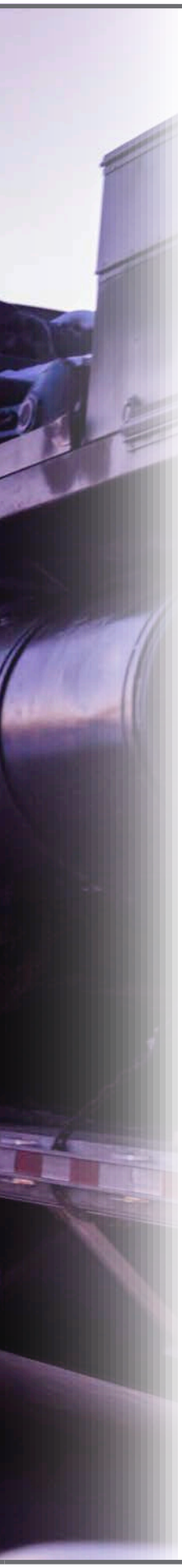
In mid-July, the DIU team announced that the first prototype vehicle was delivered for evaluation, just nine months after the first contracts were officially awarded. Other transactions can provide the government with increased flexibility to solicit sources and award agreements in a way that attracts nontraditional sources and leverages commercial capabilities. Good teams resolve conflicts quickly and constructively. Ongoing and frequent communication and collaboration among the government team and contractors will enhance the likelihood of a successful award. DIU has had success these past seven years by helping to grow the national security innovation base, attracting companies that would have otherwise passed on working with DOD. The flexibility, transparency and agility of the commercial solutions opening play an important part.

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

CHARLES PARK *is a mobilized DIU Army Reservist and a U.S. Air Force civilian contract and ethics attorney. He holds a Juris Doctor from the University of South Dakota, a Master of Public Administration from the University of South Dakota and a B.A. from the University of California, Santa Barbara.*


NATIONAL
AMERICAN
INDIAN
HERITAGE MONTH
November

THE LONG HAUL
A convoy of semitractor-trailer flatbed trucks loaded with heavy Army tactical vehicles hauls freight along a remote stretch of expressway through Utah. (Photo by Getty Images)



HOT AND COLD

For years, the Army has used ambient temperature extrapolation as a shortcut in test and evaluation, but electronically controlled powertrains have changed things and the Army test community is identifying new risks from an old Army practice—and potential cost savings.

by Steven Zielinski and Paul Maguire

Military vehicles have some of the most demanding automotive specifications, requiring operation in extreme environments ranging from arctic (50 below) to desert (120) conditions. (All temperatures are Fahrenheit.) During development, U.S. military vehicles must be tested successfully in those conditions. That's problematic because no test center in the U.S. gets that hot long enough to test accurately at 120. The Cold Regions Test Center in Alaska meets Army regulation for ambient temperature (Army Regulation 70-38, "Research, Development, Test and Evaluation of Materiel for Worldwide Use"). However, testing for desert conditions often occurs below the 120-degree threshold.

As a result of test program schedule constraints, test vehicle availability, proving ground selection and other factors, military vehicle mobility performance is often tested in the window of only 90 to 110 degrees. Is this good enough when the requirement is 120 degrees? What are the risks to our Soldiers operating these vehicles in desert warfare? By not testing at this upper extreme, vehicles may not be able to reach top speed, climb steep hills or tow disabled vehicles without overheating or suffering catastrophic damage.

THE REALITY OF T&E

In the development cycle of a tactical or combat vehicle, the cost of test and evaluation can represent a significant portion of the program's research, development, test and evaluation (RDT&E) budget. Indeed, vehicle test costs can run into the hundreds of millions of dollars. In a Spring 2018 article in Army AL&T, Robert Mortlock, Ph.D., of the Naval Postgraduate School wrote that the cost of test and evaluation in the Ground Combat Vehicle was a whopping $417 million.

Where are legitimate places to reduce testing cost? The matter of temperature extrapolation might provide a clue.

To address the extreme temperature issue, the Army has been using a linear extrapolation of powertrain test data based on the ambient temperature.

While it sounds technical, "linear extrapolation" is a simple method of predicting results by extending a trendline beyond verified test data. While this has worked fairly well for almost 50 years, the standard may no longer be as valuable as it once was. (See "What Is Linear Extrapolation," Page 77)

Many ground vehicles within the U.S. Army's fleet are either newly introduced or have undergone significant modernization in the last several years. Specifically, the vast majority of the fleet no longer uses mechanically controlled powertrains, but are now operating on electronically controlled powertrains. The difference between mechanical and electronic control is best explained by an example. In the years before electronic control gradually took over virtually all of the vehicles on American highways, it was not uncommon to see overheated cars, hoods open and steam pouring out, on the side of the road during the hottest months of summer. That is nearly nonexistent today. The difference is electronic control. The engine is controlled by a computer that employs algorithms that prevent the vehicle from going past certain thresholds.

When linear extrapolation is applied to electronically controlled powertrains, the results suffer from significant error or may be invalid entirely. Linear extrapolation has limited uses where it can be trusted, and electronically controlled powertrains is not one of them.

Everyone who has ever tried investing knows that drawing a trendline on past financial data doesn't account for all—or even any—of the economic variables that will set future pricing. Like the stock market, electronically controlled powertrains operate on complex algorithms that are influenced by too many variables to trust linear extrapolation.

BEHIND THE SCENES IN ELECTRONICALLY CONTROLLED POWERTRAINS

In order to achieve goals such as better fuel economy, increased power output, reduced emissions and enhanced diagnostic information, the heavy-duty truck industry transitioned to electronically controlled powertrains starting in the 1990s. Eventually, this transition also reached military vehicles as new vehicles were introduced or older vehicles were modernized.

Although electronically controlled powertrains often have multiple controllers, the two most common types are the engine control module (ECM) and the transmission control module (TCM). These two controllers are programmed to work in harmony to produce the optimized response of a vehicle based on criteria such as driver demand, road grade, vehicle load, ambient temperature, elevation and other factors.

To account for all of the combinations of conditions, these controllers have complex algorithms that usually have upwards of a million lines of software code.

While the driver interfaces with these controllers through the simple and singular input of the accelerator pedal, a network of feedback sensors is providing data to those controllers such as

TEMPERATURE EXTREMES

It can be a challenge to find environments suitable for testing certain Army vehicles, which require exposure to both extreme heat and cold. (Photos by Getty Images)

WHAT IS LINEAR EXTRAPOLATION?

During mobility-performance testing, there are several key temperatures that govern the outcome. First, the vehicle performance specification lists an upper requirement of ambient temperature in the test environment for powertrain cooling. Most commonly, this is 120 degrees as this represents the extremes of desert warfare. Second, the vehicle powertrain has critical limits for each of its fluid temperatures (i.e., coolant, engine oil, transmission fluid, intake manifold air, etc.). The manufacturer assigns these critical-limit temperatures as a not-to-exceed boundary before damage or failure ensues, and the test fails. Lastly, ambient temperature—the air temperature during the test—significantly impacts the measured performance. While ambient temperature at time of testing should be the same as the vehicle's upper requirement for ambient temperature, that presents a problem. Ambient temperatures above 110 degrees rarely occur except as the peak temperature of the day within the United States. So, even though places like Death Valley and Yuma Proving Ground can touch 120 degrees, they can do that only for part of the year—June through August—and so the windows of opportunity to test at the temperature necessary are very small. Contrast that with the Army's environmental chambers that can do it any day.

As an example, assume testers measure the ambient temperature as 90 degrees and engine oil temperature as 250. We need to know the fluid temperature in hot desert conditions, so we subtract 90 degrees from 120, then add that extra 30 degrees to the fluid temperature of 250. That's linear extrapolation. For every increase of 1 degree in the ambient temperature, the fluid temperature can be expected to rise by the same amount. Therefore, in this test, linear extrapolation would predict the engine oil temperature as 280 degrees. If the vehicle had a critical limit for engine oil temperature at 275 degrees, it would fail the test.

Under the right conditions, linear extrapolation of ambient temperature has been a useful tool when attempting to predict the performance of mechanically controlled powertrains. Because there are so many more variables with electronically controlled powertrains, linear extrapolation isn't any longer a valid approach to the Army's needs because we can't see into proprietary algorithms and don't know the variables the algorithms are using for control.

wheel speed, engine speed, coolant temperature, transmission oil temperature, engine oil pressure, intake manifold air temperature and many other parameters.

To understand the major components of electronically controlled powertrains, think of the controller as the brain and the sensor network as the nervous system. The sensor network is constantly relaying information to the controllers about the vehicle's status and health. The controllers then make decisions on behalf of the driver to deliver the best available performance. Without the brain and nerve system of the algorithm and the controller and sensor network, mechanically controlled powertrains are unaware of their health status, unable to provide warning information to the driver (check engine light) or initiate self-protecting countermeasures to avoid catastrophic failure, such as overheating and blowing the engine head gasket.

Interpretation of the data from feedback sensors by the controller is handled by a series of proprietary algorithms owned by the manufacturer. Since this information is not typically made available to the U.S. military, it is crucial to test the vehicle in representative conditions and observe the response to ensure the vehicle meets the requirement.

NO SUBSTITUTE FOR PROOF

Even when information is available from the manufacturer regarding its control algorithms, the importance of testing in representative conditions is not diminished. Manufacturers do not always know the decisions their controller will make in all circumstances. Manufacturers use software modeling tools to predict the controller's decision, but these software models also require validation in order to be fully trusted when operating at the extremes of their design intent.

Furthermore, even with validated software models, there could be powertrain hardware limitations that remain undiscovered until the vehicle undergoes comprehensive testing.

While electronically controlled powertrains have greatly simplified the responsibilities of the operator, they provide challenges to the Army test community when attempting to evaluate mobility performance at desert operating conditions (120 degrees). Their ability to self-regulate their critical operating limits occurs in two primary methods: engine deration and modulated powertrain cooling. (See "What Is Engine Derate?")

Both of these regulation methods often have a nonlinear response to the change in ambient temperature. In order to definitively evaluate a vehicle's mobility performance of an electronically controlled powertrain, the vehicle must be immersed in the targeted environment to produce a representative response. This becomes particularly challenging for ambient temperatures at 120 degrees as these temperatures are rarely occurring within the United States.

OUT OF THE DESERT AND INTO THE OVEN

Even though permitted by test operating procedures, linear extrapolation of powertrains fluids based on ambient temperature should be heavily discouraged when considering electronically controlled powertrains as this can practice introduce significant error or invalidate the test results.

If linear extrapolation is not an option for electronically controlled powertrains, what is the solution?

Since the 1950s, the Army has invested hundreds of millions of dollars in vehicle laboratories that have environmental control. These facilities can heat or cool the air from 50 below to 120. Furthermore, they are equipped with dynamometers to exercise the vehicle's powertrain. A dynamometer is essentially a treadmill for vehicles. These vehicle laboratories have the capability to test every tactical or combat vehicle from a Humvee to an Abrams, all with the vehicle operating at top speed but standing still.

To study the dangers of linear extrapolation on electronically controlled powertrains, test data was analyzed by test engineers from the Ground Vehicle Systems Center (GVSC). This test data came from various sources including engine, power pack (engine plus transmission plus cooling system), or full-vehicle test programs on vehicle platforms such as Abrams, Stryker, the M109A7 self-propelled howitzer and the Heavy Equipment Transporter.

WHAT IS ENGINE DERATE?

Though both operate via a simple accelerator pedal, electronically and mechanically controlled powertrains are vastly different under the hood, so to speak. In a mechanically controlled powertrain, the force of the driver's foot on the accelerator pedal is physically transferred via linkage or cable to the engine's fuel injection pump. More force on the pedal, more gas to the engine. While this simplicity has a predictable outcome, it comes with some disadvantages. In the event the vehicle is operating in a hot environment or under heavy load, a driver may unintentionally surpass critical limits for engine oil temperature or coolant temperature, which could result in severe damage, like blown head gaskets, failed main bearings, scored cylinder walls and other heat-induced failures. That means that a mechanically controlled powertrain will meet the driver's demands even to the point of total catastrophic failure. The only restraint might be a driver's own response to indicators like temperature gauges or warning lights.

In contrast, electronically controlled powertrains inherently possess the ability to self-limit—and effectively override the driver's demand for more. They monitor and control their own condition from the feedback of the sensor network and prevent operation beyond critical limits. If the driver floors demands 100 percent, the system won't honor the demand if the driving conditions are too severe. That is engine derate.

What's important to understand here is that error resulting from extrapolation combined with electronic controls introduces a bias toward failure—the error can fail a perfectly good vehicle because the test data is wrong.

Due to these operating principles, linear extrapolation will always produce a false failure, but never a false pass. It's important that this one-way bias is recognized as it presents significant risk to a vehicle acquisition program.

Testing took place at the GVSC Propulsion Systems Laboratory and the Power Energy Vehicle Environmental Laboratory (PEVEL). In the laboratory setting, the ambient temperatures were controlled to produce representative environments matching the vehicle's upper ambient temperature specification (120 degrees). Performance data was then compared on the same test setup at the same operating point while at a lower ambient temperature (80-90 degrees).

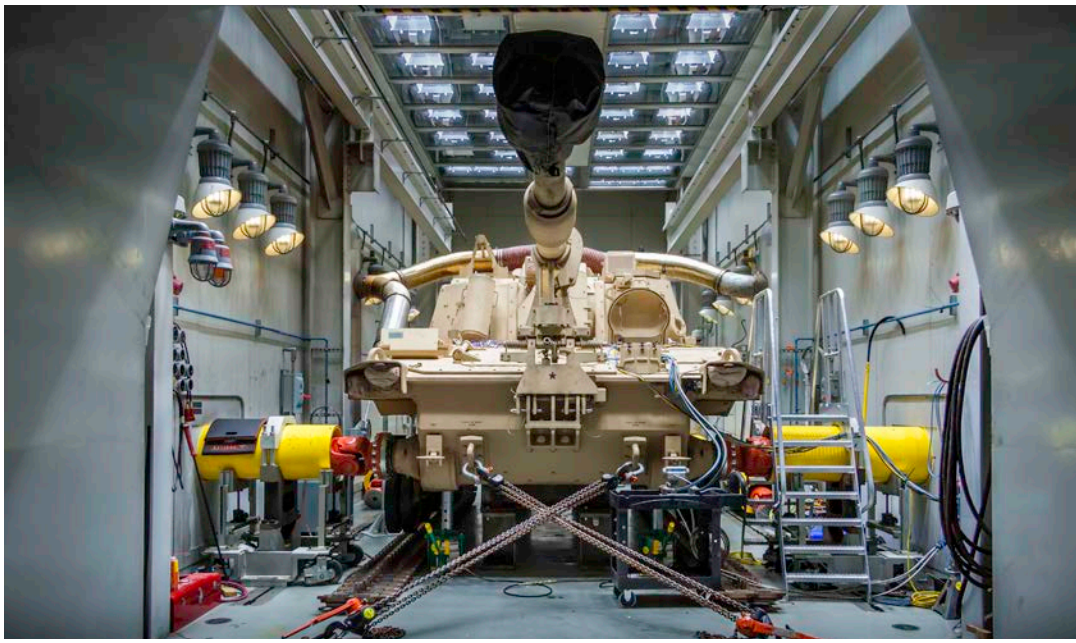
From this test data, the linear extrapolation method described in Army test operating procedures (Test Operations Procedure 2-2-607 "Cooling Systems [Automotive])" was then applied to measurements of engine oil temperature. This provided a set of actual results at desert operating conditions (120 degrees) and an extrapolated set.

With a set of results from actual ambient temperatures and a set from extrapolated temperatures, we could calculate the error introduced by the prediction of extrapolation. Based on this test data, extrapolation of engine oil temperature was 65 percent to 116 percent off from the actual measurement. The electronic controls prevented the powertrain from overheating even though linear extrapolation said it would.

For example, with that 65 percent error, linear-extrapolation-predicted engine oil temperature was 270 degrees when it was actually 250. This is a huge change considering a vehicle will pass or fail mobility performance testing at the proving ground by crossing the threshold by 1 degree.

In the past, the Army has led many investigations such as Yuma Proving Ground Report No. 221 and No. 135 into the impact of extrapolation error. This series of studies occurred back in the 1970s and only studied mechanically controlled

DYNO LAB
The Power Energy Vehicle Environmental Laboratory (PEVEL) Environmental and Dynamometer Laboratory has the capability to test every tactical or combat vehicle at top speed but standing still. (Photo by Stephen Roberts, GVSC)



HIGH TEST
A self-propelled howitzer (M109A7) in PEVEL for mobility performance testing at 120 degrees. The types of tests conducted at the vehicle laboratory on tactical and combat ground vehicles are many. The influence of ambient temperature varies. (Photo by Steven Zielinski, GVSC)

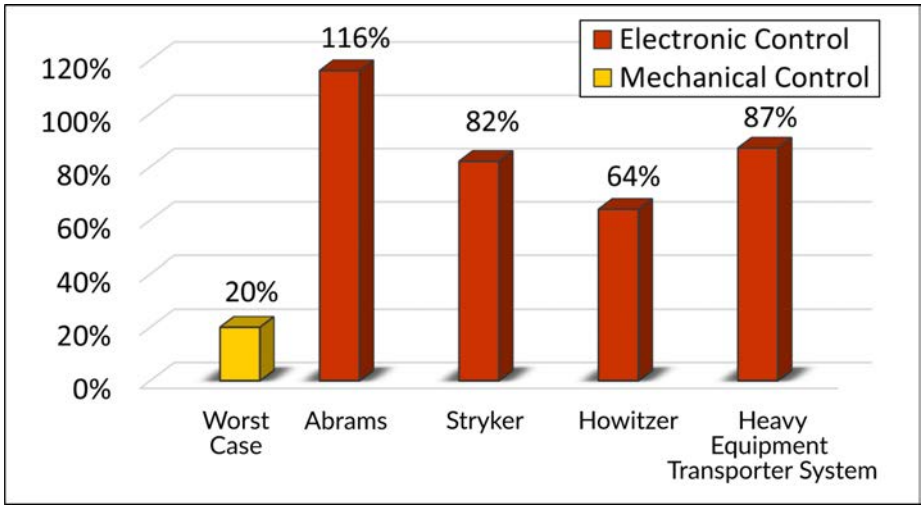
powertrains. At that time, extrapolation error was usually observed as 10-20 percent. However, the extrapolation error on electronically controlled powertrains is approximately three to five times more severe than the extrapolation error for mechanically controlled powertrains. With so much error in the test results for powertrain performance, we can have little confidence in how the vehicle will actually respond to the extreme demands of desert warfare.

In addition, it is important to note that the error resulting from linear extrapolation is biased towards false failures. In other words, linear extrapolation will predict engine or transmission overheat on a vehicle that may have had no issue if actually tested at 120 degrees.

This is because linear extrapolation cannot account for control algorithms that might derate the engine power or increase powertrain cooling to lower key parameters such as engine oil temperature, engine coolant temperature and transmission oil temperature. (See "What Is Engine Derate?" Page 78.)

SOLUTION FOR NONREPRESENTATIVE TEST CONDITIONS

If you have ever attempted to adjust the thermostat in your home or workplace to your preferred setting, you have probably experienced the disruption in harmony with those individuals who are hypersensitive to changes in temperature. A battle over 70 degrees versus 72 degrees ensues. Electronically controlled powertrains know when the "thermostat" has been touched and they care. Linear extrapolation of key powertrain parameters such as engine oil temperature, engine coolant temperature and transmission oil temperature has too much error to be trusted during mobility-performance testing.



TEMPERATURE TESTING
Extrapolation error of engine oil temperature during mobility performance testing at desert conditions. (Graphic by Steven Zielinski, GVSC)

UPFRONT PERSPECTIVE
The Palletized Loading System (M1074A1) in PEVEL for mobility performance testing at 120 degrees. Using the "oven" for actual ambient temperatures produces much more accurate results. (Photo by Stephen Roberts, GVSC)

It is crucial to test the vehicle in representative conditions and observe the response to ensure the vehicle meets the requirement.

What does this mean for the test and evaluation community? How does this impact ongoing or future test programs?

The types of tests conducted on our tactical and combat ground vehicles are vast with varying levels of influence by ambient temperature. For instance, determining a vehicle's roll-over tipping point on a tilt table is completely unrelated to the ambient temperature during the test. The tests most impacted by the change in ambient temperature are those that will require peak engine power and torque during mobility-performance testing.

Mobility-performance testing is predominately evaluated by three different tests: 1) Vehicle top speed; 2) Max grade hill climb; and 3) Full-load cooling. The outcomes of these tests tell the Army the vehicles' maximum traveling speed, the steepest grade it can climb and how much torque it can produce without overheating to the point of engine damage.

The Army needs to run these three tests at 120 degrees to guarantee that electronically controlled powertrains will deliver the performance advertised by the manufacturer. This means that tests will need to be scheduled both geographically and seasonally in order to ensure this ambient temperature is reached. If this is not possible outdoors at a test range because of test program schedule constraints, the test needs to be performed in a laboratory with environmental control and dynamometers.

CONCLUSION

As technology continues to advance in order to ensure that the United States warfighter has superior advantage, military vehicles will continue to gain in complexity and sophistication. When evaluating vehicles with electronically controlled powertrains, linear extrapolation of powertrain fluids can introduce significant error during mobility-performance testing or deliver completely invalid results.

For conducting mobility-performance testing at the upper requirement for ambient temperature (120 degrees), the test program can be supplemented with laboratory testing. This is not just about simple cost savings. Most likely, there is a slight cost savings to running tests in the environmental chamber over the proving ground. The point is that we pay a great deal of money for testing that may be bogus. People *think* that linear extrapolation reduces costs, and therefore they can test anywhere in the United States at any temperature. Freedom in exchange for useless results—or results that harm the chances of a vehicle the Army wants and needs in passing a test—is a terrible bargain. If you evaluate cost savings for testing in seasonally and geographically appropriate areas to actually have 120 degrees, environmental chamber testing would probably be a huge savings. But that proposition remains to be tested, because up to this point we as a test community have not been willing to limit ourselves to test at 120 and instead insist on extrapolation.

Within the laboratory environment, the ambient temperature can be controlled to produce representative responses from the vehicle's powertrain. However, laboratory testing cannot be seen as a replacement for field testing as other vehicle systems such as wheels or tracks or suspension are not being exercised. Using both field and laboratory testing is necessary to comprehensively evaluate vehicles with electronically controlled powertrains.

For more information, view the comprehensive technical paper in DTIC (AD1170619) or contact the authors, ***steven.m.zielinski2.civ@army.mil*** *and* ***paul.b.maguire4.civ@army.mil****.*

STEVEN ZIELINSKI is a technical specialist for Ground Vehicle Power and Mobility - Test and Evaluation team at the Ground Vehicle Systems Center (GVSC). He holds an M.S. in mechanical engineering from Wayne State University and a B.S. in engineering physics from Oakland University. He holds the DAWIA Practitioner certification in engineering and technical management.

PAUL MAGUIRE is a technical specialist for Ground Vehicle Power and Mobility - Test and Evaluation team at GVSC. He holds an M.S. in mechanical engineering and a B.S. in chemical engineering, both from Wayne State University. He earned his Professional Engineering license in mechanical engineering in 2006. He holds the DAWIA Practitioner certification in engineering and technical management.

TRIED AND TRUE

The experiments validated several ERDC-developed bunker modifications that reduced the exposure to personnel within the bunker and reduced their vulnerability to traumatic brain injuries.

A *BETTER* BUNKER

New designs will protect against brain injuries.

by Tim Reeves and Chris Kieffer

In the early hours of Jan. 8, 2020, American troops and civilians stationed at the Al Asad Air Base in Iraq put the finishing touches on their preparations for an impending attack from Iranian forces.

Thanks to advance information and intelligence, commanders on the ground were given time to move many of the troops and each of the base's 51 aircraft to safety.

Those who remained donned body armor and helmets and staged inside the base's open-ended bunkers. While they knew of the impending attack, they did not know the extent of what they were facing.

With Iranian missiles en route, the estimated 2,000 remaining troops sought protection in the bunkers designed to protect them against rockets and mortars. But, during the ensuing 80-minute bombardment, the threat was far more and far larger than expected.

Throughout the barrage, the base was battered by more than a dozen ballistic missiles, carrying warheads in excess of 1,000 pounds.

As the echo of the final strike subsided, leaders took stock of the damage and injuries. Early reports found that although the damage was significant, no one was killed. However, in the weeks and months that followed, more than 100 service members and civilian contractors at the base were diagnosed with traumatic brain injuries (TBI).

Those injuries were tied back to the blast waves generated during the attack and how those waves echoed and were further amplified throughout the bunkers.

BRAIN WORK

In response to this attack and the resulting injuries, engineers and scientists at the U.S. Army Engineer Research and Development Center (ERDC), in coordination with the U.S. Army Corps of Engineers (USACE) Transatlantic Division and the USACE Protective

OBSERVATIONS AND EXPERIMENTATION
Maj. Gen. Kimberly Colloton, left, and Col. Teresa Schlosser, right, visit an experiment to test the new bunker retrofit at Fort Polk, Louisiana, in December 2020. (Photos by U.S. Army Engineer Research and Development Center)

Design Center (PDC), developed simple and effective bunker enclosure door designs for the U.S. Central Command (CENTCOM). The new designs sought to reduce the peak pressures experienced by an individual seeking shelter in a bunker by more than 90 percent.

The response was rapid. The USACE Reachback Operations Center received a request on the day of the attack seeking ERDC's expertise in developing a protective solution. ERDC immediately assembled a team of experts to support rapid deployment of an in-theater modular protective system and to provide tele-engineering support to CENTCOM for immediate courses of action. The team also began working on a quick-reaction research plan to address the traumatic brain injury issue.

"This project had high visibility and a short timeline," said Jessica K. Fulk, a research civil engineer at ERDC's Geotechnical and Structures Laboratory and project lead for the bunker effort.

By August of 2020, CENTCOM tasked ERDC to replicate the events from January 2020 to measure the blast properties that were experienced by the Soldiers and to reduce blast pressures inside the bunkers.

The research team completed 120 high-fidelity simulations using ERDC's DOD high performance computing system to evaluate pressure flow in and around objects. The research used three million processor hours on the DOD High Performance Computing Modernization Program systems, as the complex models each took 10 to 24 hours per run on these supercomputers.

This modeling investigated a matrix of conditions, such as occupant location and bunker orientation and geometry. But the findings showed that changing these parameters did not significantly reduce personnel exposures.

In their testing, researchers found that using doors to enclose the bunkers was the most expedient and effective means to manipulate the internal blast conditions, reducing the likelihood for traumatic brain injury. The door design reduces internal bunker peak pressure by nearly seven times compared to open air.

The team worked closely with the Missile and Space Intelligence Center and the National Ground Intelligence Center to collect information and guide the design of the enclosure. They coordinated with the Medical Research and Development Command to gain a better understanding of traumatic brain injuries.

BRAINS ARE DYNAMIC AND FLUID

"Around the time our project was wrapping up, a news article came out discussing the lasting effects of traumatic brain injury that the Soldiers from Al Asad have experienced, which drove home the importance of what our team was accomplishing," Fulk said.

"Our main goal is always to protect the warfighter," she continued, "and this is a unique instance where we were able to see widespread fielding of our solutions that will help prevent these injuries and save lives in the event of future attacks."

In December 2020, less than a year after the attack, leveraging years of survivability research conducted under ERDC's Expedient Passive Protection Program, large-scale field experiments were held on the enclosures, which validated the research and computational models.

The final set of large-scale experiments were executed in January 2021. These tests validated several ERDC-developed bunker modifications that reduced the exposure to personnel within the bunker and reduced the vulnerability to traumatic brain injuries. These modifications took into consideration ease of implementation, cost and the ability to construct.

BUNKERS GET A BOOST
The U.S. Army Engineer Research and Development Center, along with collaborators, developed bunker modifications that reduced the exposure to personnel within the bunkers and reduced their vulnerability to traumatic brain injuries. A modified concrete bunker undergoes testing at a range at Fort Polk, Louisiana, in January 2021.

SCALABLE FUTURE

The final design package was completed in July 2021, with nearly 1,000 bunkers spread throughout other countries identified for retrofit.

"The larger team's constant flow of data forced our prototype at ERDC to focus on the future scalability," said John M. Hoemann, a research civil engineer at ERDC's Geotechnical and Structures Laboratory. "Our design loads for future retrofits varied based on streaming threat data from the theater. Listening to the real-time needs that might change during a daily call required us to hear, compile and adapt the designs.

"Ultimately, we wrapped up not just a prototype, but a process for redesigning for different scenarios. We had to do this to truly make an adaptable prototype," he said.

ERDC's bunker retrofit solution was developed, tested and deployed in less than a year—thanks in large part to ERDC's

> "Our main goal is always to protect the warfighter."

core competency in blast and weapons effects on structures. It also benefitted from the research organization's cross-laboratory environment. For example, ERDC used its 3D printing capabilities to quickly produce unique instrumentation mounts that simulated a human head for field testing. Meanwhile, ERDC's work in invasive species and fish migration allowed the team to pull in a biologist with enough knowledge of brain injuries to better interface with the experts at the Medical Research and Development Command.

CENTCOM commander, Gen. Kenneth F. McKenzie Jr., recognized this effort by thanking the ERDC team for its "extraordinary work on the Personnel Bunker Study."

"The recent attack on U.S. personnel at Al Asad Air Base served as a reminder of the very real dangers our military members face carrying out their daily missions," McKenzie wrote. "I am confident that your study findings will reduce the risks posed to our military and will ultimately save lives. ERDC and the Army Corps of Engineers continue to be valuable members of the (CENTCOM) team and combat multipliers across my area of responsibility."

The team that completed the Personnel Bunker Study was also recognized with a 2022 Innovation of the Year award from the U.S. Army Corps of Engineers.

CONCLUSION

Because the USACE Transatlantic Division supports engineering activities across the joint forces in CENTCOM's area of responsibility, this solution was applied broadly.

The U.S. Air Force has begun implementation of these specific designs and configurations for their applications as well.

ERDC and the USACE Transatlantic Division have briefed leaders within the U.S. Africa and U.S. Indo-Pacific Commands on this research and have received interest on implementing its recommendations.

Additionally, the knowledge gained regarding protection from traumatic brain injury has driven additional efforts from the USACE Protective Design Center and assisted in the understanding and development of new training and safety concerns being addressed by the U.S. Army Counter Explosive Hazards Center.

The blast data also will be provided to the medical community for future traumatic brain injury research.

"This project was very different from others I have worked on in that it was a very specific but very challenging problem where we had to find a deployable solution with very limited time," said Catie Stephens, Ph.D., the director of ERDC's International Research Office. "This project could have required hundreds of experiments to better understand the problem, but we were able to do a very small set of large experiments that allowed us to solve the main request, a retrofit to bunkers that decreases the risk of traumatic brain injury, while also gathering data that is valuable for solving the problem—how and why blast-induced traumatic brain injuries occur. All of that data was shared with the Medical Research and Development Command in order for them to make progress on the bigger problem."

*For more information, email **ERDCInfo@usace.army.mil** or go to **https://www.erdc.usace.army.mil/Locations/GSL.aspx**.*

TIM REEVES is a communications specialist with the U.S. Army Engineer Research and Development Center. Prior to joining ERDC's corporate communications team, Reeves spent nearly three decades in journalism working as a photographer, reporter and editor at newspapers throughout the southeast United States.

CHRIS KIEFFER is a communications specialist with ERDC. He spent more than a decade as a reporter and editor with the Northeast Mississippi Daily Journal and Oxford (Mississippi) Eagle newspapers. Kieffer holds an M.A. in journalism from Columbia University and a B.A. in journalism from the University of Mississippi.

PRACTICE MAKES PERFECT
A Chinook crew conducts a simulated mission in the CH-47 systems integration laboratory. The Combat Aviation Brigade Architecture Integration Lab relies on Soldiers from all components to provide current, relevant input from all echelons of Army aviation. (Photos by David Hylton, PEO Aviation)

SHAPING AVIATION'S FUTURE

The Combat Aviation Brigade Architecture Integration Lab enables aviation warfighters and materiel developers to co-develop, integrate and examine maturing systems and capabilities and improve the force in a streamlined manner.

by Al Abejon

The Combat Aviation Brigade Architecture Integration Lab at the Program Executive Office (PEO) for Aviation on Redstone Arsenal, Alabama, houses a unique combination of advanced development and simulation capabilities for Army aviation. It blends multiple live, virtual and constructive simulations of manned and unmanned aircraft, air and ground mission systems and command and control, which together provide a comprehensive replication of an aviation force in a tailorable air-ground operations environment.

The laboratory enables a more streamlined and efficient means of exploration and experimenting with the evolving capabilities of maturing technologies in a risk-reduced, realistic setting. These activities demonstrate the impacts of technical advances on the capabilities of our current aircraft and influence the design, architecture and implementation of Future Vertical Lift aircraft. They also provide an initial understanding of resultant changes in the operational effectiveness of aviation as a collective force.

Established in December 2019, the Combat Aviation Brigade Architecture Integration Lab is a combination of interoperable, high-fidelity, current force, manned and unmanned aircraft systems integration labs, simulators and emulators. The need to demonstrate, test and validate system capabilities from a force perspective in a risk-reduced and cost-effective realistic operational environment is one of the driving concepts for the development of the laboratory. Rather than focusing on developing and exploring capabilities of an individual system or aircraft, this facility examines the resulting operational effectiveness of new capabilities across the total aviation formation.

"The lab is an excellent tool to conduct risk reduction evaluations on new technologies at a fraction of the cost of using actual aircraft," said Robb Keeter, the laboratory's senior program integrator and operations officer. "It allows the project managers to examine new aviation hardware and software in a realistic air-ground operations environment."

AIR PLATFORMS INTEGRATED

The Combat Aviation Brigade Architecture Integration Lab contains Apache, Black Hawk and Chinook aircraft systems integration laboratories, Gray Eagle and Shadow unmanned aircraft systems ground control stations and an aviation tactical operations center. The systems integration laboratories consist of partial aircraft fuselages that have been re-purposed for engineering development to host mission systems and equipment of the actual aircraft. These systems integration laboratories are not flight simulators or training systems; rather, they are high-fidelity aircraft replications used to support the development, integration and modernization of aviation systems.

Planning, communications, navigation, weapons, sensors and many other systems are included for a total force perspective. Collectively, they are key in assessing the operational efficacy of new technologies on the operations of the combat aviation brigade as a maneuver force.

The Combat Aviation Brigade Architecture Integration Lab's Battle Master is the central hub of the facility. It augments the virtual aircraft system-integration labs and replicates the rest of the aviation force through multiple constructive simulation stations that can be configured to emulate additional aircraft and their respective capabilities, as well as supported ground forces. The Battle Master also establishes the operational environment and injects effects such as rain, smoke, fog, artillery fires, close-air support, naval gunfire and ground threats.

APPROACHABLE OPEN SYSTEMS

Another important aspect of the lab is the ability to explore and examine the application of modular open-systems approach implementation techniques and standards in incorporating emerging technical solutions into aircraft. These standards promote commonality and standardization of hardware, software and data exchange aboard current and future aircraft. The laboratory contains multiple aircraft integration assets that can be used by the aviation project managers and industry partners to explore the use of established modular open-systems approaches to standardize aircraft integration of communications, navigation, sensors, weapons and mission command systems. PEO Aviation's Modular Open Systems Approach Transformation Office provides the guidance and direction for implementing this architecture approach across the aviation domain.

The laboratory is also able to replicate networks and information exchange capabilities of an aviation force maneuvering through an operational area. Compatible out-the-window visual systems and a common terrain database enable visual interoperability to include sharing of sensor video among the aircrews and actual communications equipment with replicated networks provide air-ground and air-air information exchange.

The systems integration laboratories, simulators, emulators and equipment in the laboratory are interoperable with each other and with other similar facilities such as the Army Research Laboratory locations at both Aberdeen Proving Ground, Maryland, and the Ground Vehicle Systems Command in Michigan. The

BRIGADE BATTLE MASTER
The Combat Aviation Brigade Architecture Integration Lab's Battle Master replicates the remainder of the aviation and ground forces to complement the live and virtual simulators and establishes the simulated operational environment during testing scenarios.

Combat Aviation Brigade Architecture Integration Lab employs an automated constructive simulation program known as One Semi-Automated Forces, or OneSAF, to create a common realistic operational environment in which simulated forces can operate together. A critical purpose of the laboratory and its systems is to participate in operational experimentations and to exchange critical mission planning and execution data with other labs in the Army and the other joint services.

The laboratory brings Soldiers in to participate in activities to provide user input and feedback on new technologies well before fielding begins. The exercises often include active duty, Army Reserve and National Guard Soldiers from various aviation-related career fields. The Soldiers provide current relevant input from all echelons of Army aviation.

"The lab is helping determine what [capabilities] future aviators could get to further their situational awareness," 1st Lt. Andrew Rines, a Black Hawk pilot with the Tennessee Army National Guard, commented after an event.

ACTUAL COMBAT IS TOO LATE

The testing and development of aviation systems for use in a combat environment cannot wait until actual combat occurs. The Combat Aviation Brigade Architecture Integration Lab provides a highly

This facility examines the resulting operational effectiveness of new capabilities across the total aviation formation.

THIS IS JUST A TEST
An AH-64 Apache aircrew conducts a simulated mission in the Combat Aviation Brigade Architecture Integration Lab, Apache systems integration laboratory. A decommissioned Apache fuselage is used for the development, integration and testing of new systems.

relevant collective venue to rapidly pursue and evaluate new and emerging technologies along with mission command options and alternatives. Experiments and computer exercises in the laboratory help increase the effective flow of mission-command information as well as improving accurate and relevant situational awareness, command and control, adjudication of aerial fires, key logistics deliveries and life-saving medical support.

The focus of the Army's operational doctrine has shifted from counter-insurgency operations over the past 20 years to large scale combat operations. This shift is highlighted by the conduct of operations at greatly extended ranges, in contested and uncontested environments, against a larger, highly sophisticated threat. The complexities of these types of operations in the joint all-domain operational environment require the Army to execute the fight in an extended maneuver battlespace, conduct deep strike operations, operate as an element of a joint force and ultimately prevail in all combat situations. The laboratory provides a means to rapidly develop and address the challenges of these changes in operational concepts using reduced manning and resources. It also supports continued modernization of the Army's enduring aviation fleet while simultaneously influencing the establishment of Future Vertical Lift aircraft requirements, design and architecture.

CONCLUSION

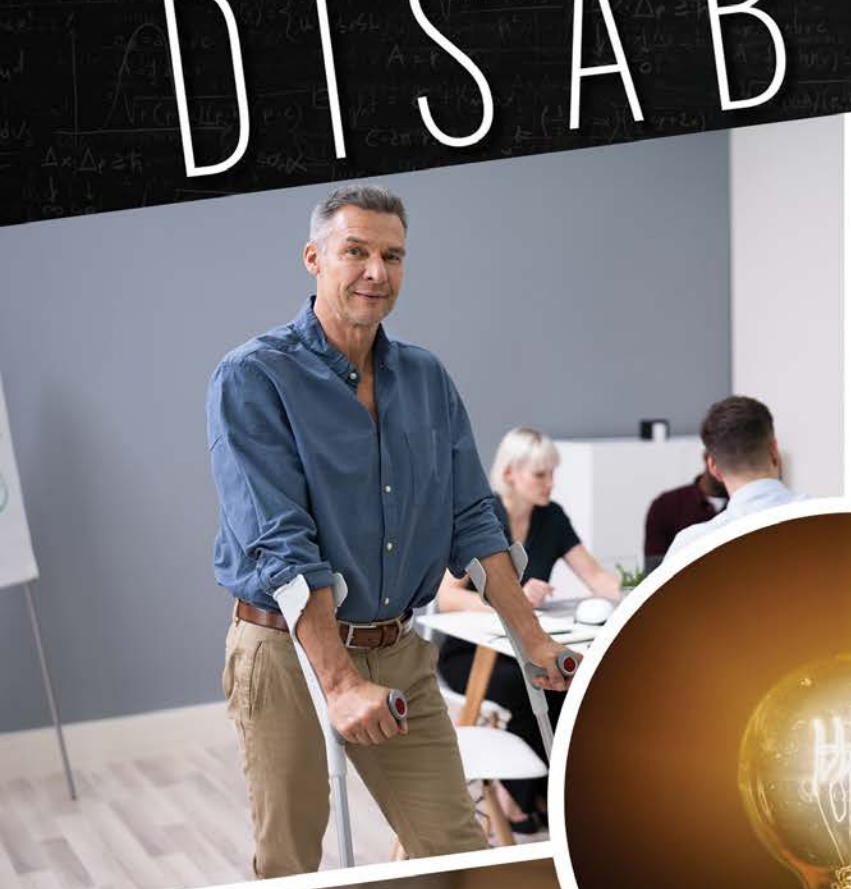
Today's Army exists and operates in a budget-constrained environment and it must be creative in maximizing the application of all available resources. The Combat Aviation Brigade Architecture Integration Lab provides a means by which warfighters and materiel developers can co-develop and examine systems and capabilities in a streamlined manner. It enables the warfighter to be equipped with operationally verified capabilities in an expedited manner with less risk and at reduced development costs. These concepts and attributes further ensure Army aviation's readiness and its ability to fight and win as a maneuver force of the Army's Combined Arms Team and element of the Multidomain Task Force today and into the future.

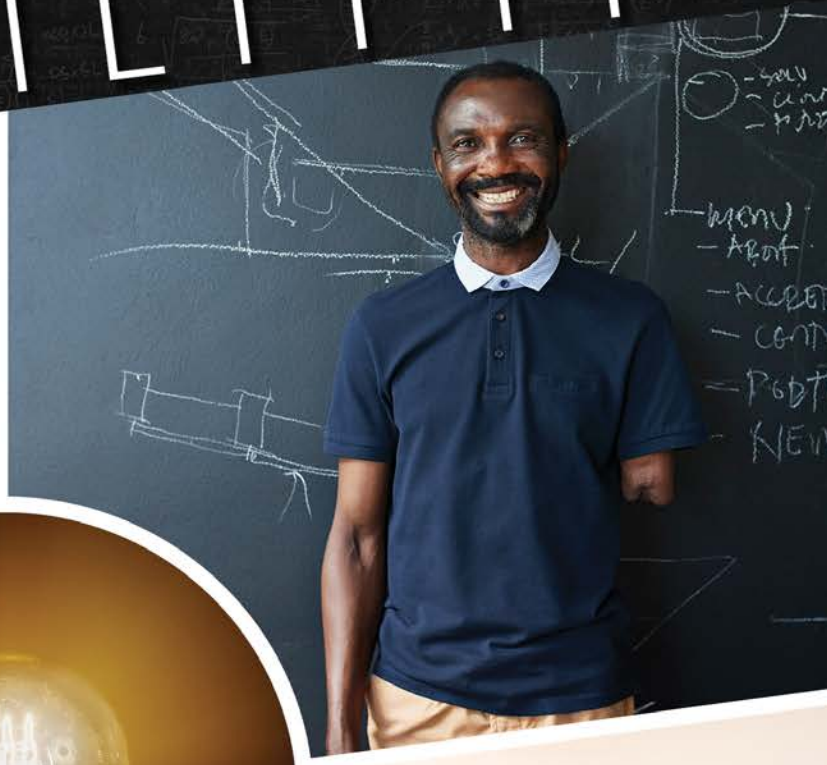
For more information, go to: ***http://army.mil/PEOAviation****.*

AL ABEJON is the director of the Combat Aviation Brigade Architecture Integration Lab at PEO Aviation, and holds the DAWIA Advanced certification in program management. His U.S. Army aviation experience spans over 50 years as an enlisted Soldier, warrant officer, commissioned officer, support contractor and government civilian. As a master Army aviator, he has logged over 5,000 flight hours and is rated in 15 different Army fixed and rotary wing aircraft. He has a B.A. in professional aeronautics from Embry-Riddle Aeronautical University. His military education includes the Aviation Warrant Officer Advanced Course, Aviation Officer Advanced Course, Combined Arms Services Staff School and the Materiel Acquisition Management and Advanced Program Management courses from Defense Acquisition University.

NATIONAL DISABILITY EMPLOYMENT AWARENESS MONTH

DISABILITY:





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OFFICE OF DISABILITY EMPLOYMENT POLICY
UNITED STATES DEPARTMENT OF LABOR

VIVIANA GUTIERREZ JIMENEZ

COMMAND/ORGANIZATION: Joint Program Executive Office for Armaments and Ammunition (JPEO A&A) Project Director for Joint Services

TITLE: Program management engineer

YEARS OF SERVICE IN WORKFORCE: 16

DAWIA CERTIFICATIONS: Practitioner in production, quality and manufacturing

EDUCATION: M.S. in engineering management and B.S. in electrical engineering, New Jersey Institute of Technology

AWARDS: Combat Capabilities Development Command (DEVCOM) Armaments Center Quality Engineering and System Assurance Employee of the Month (2009), DEVCOM Armaments Center Munitions Engineering and Technology Center Demilitarization and Environmental Division Employee of the Quarter (Oct. – Dec. 2019)

BRING YOUR A-GAME

If you are interested in an Army acquisition career field that sounds "dangerous and fascinating at the same time," Viviana Gutierrez Jimenez has you covered. "I have demilitarized munitions items dating as far back as the Vietnam era and I get to blow things up," she said.

Gutierrez serves as a project management engineer for the Product Director for Demilitarization within the Joint Program Executive Office for Armaments and Ammunition (JPEO A&A). Her responsibilities include managing a portfolio of more than $200 million to strategically plan, budget and execute the demilitarization of conventional ammunition that has come to the end of its life cycle for all the U.S. armed forces. The purpose of her work is to properly demilitarize or dispose of obsolete, unserviceable and excess conventional and missile munition to reduce the stockpile and open storage space for serviceable munitions.

"Demilitarization happens in a controlled and regulated environment. It takes place at a military detonation range where field operators set up open detonation pits with pre-selected munition items. The items are wired to a time fuse or electric shock, then from a shelter away from the detonation zone, a button is clicked to fire the pits," she explained. "We watch the detonation through a window."

Gutierrez travels often to the 12 U.S. demilitarization sites but "this is not my everyday job," she said, "it only happens when I go visit one of the multiple demilitarization operation locations." Her typical day is in the office where she works with a team to plan and fund these efforts and track the work completed. This process is important to the Army and the warfighter in order to clear room for serviceable items throughout the U.S. and overseas storage facilities, thereby allowing the services to be efficiently mission ready. "I take my job very seriously and do my very best to support our mission," Gutierrez said.

Gutierrez began her career with the Army Acquisition Workforce straight out of college after attending a career fair. Her first position was an electrical engineer role supporting the quality engineer and system assurance directorate under the U.S. Army Combat Capabilities Development Command (DEVCOM) Armaments Center, Army Futures Command, where she worked on quality engineering, systems assurance, reliability and system safety competencies.

"I got an interview and learned about Picatinny Arsenal and its mission. At the time, our forces were supporting Operation Iraqi Freedom so the job appealed to me because it would allow me to participate in acquisition projects from cradle to grave, while ensuring that the systems were safe and operational for the safety of our warfighters," she said.

Since then, Gutierrez has worked on a wide range of programs in multiple phases of the life cycle. For example, from 2014 to 2018 she was the software quality engineer for the Armored Multi-Purpose Vehicle, working to validate the vehicle's software. Now, she

EXPLORE THE OUTDOORS

Viviana Gutierrez Jimenez hikes the Havasupai Indian Reservation in Grand Canyon National Park, Arizona, in June 2018. Outside of the office, hiking and exploring the outdoors are some of her favorite pastimes. (Photo courtesy of Viviana Gutierrez Jimenez)

leads planning and execution for the demilitarization of conventional munition and missile items.

One of the major programs she supported from 2006 to 2011 was the Common Remotely Operated Weapon Station (CROWS), a remote weapon that can engage targets while the Soldier remains protected inside an armored vehicle. Gutierrez participated in source selection, testing and evaluation, and preparing and presenting the urgent materiel release of the first units to support Operation Iraqi Freedom and Operation Enduring Freedom. "I feel the proudest after seeing some CROWS systems come back from theater destroyed," she said. When those systems come back destroyed, she knows warfighters' lives were saved.

"I have grown my career from drafting performance specifications and doing testing, to project management of the demilitarization portfolio. In CROWS, I learned that the work I did preparing a performance specification resulted in providing the warfighters with a high-quality system that saved Soldiers' lives," she said. "These experiences have allowed me to grow in my career, understand the bigger picture, and continue to contribute to the defense of our nation."

"Program management is very demanding, and dynamic, you must bring your A-game every day."

According to Gutierrez, the most important aspect of her career within the workforce is the opportunity for career-broadening experiences. She always recommends that her peers give themselves a chance to participate in developmental assignments or co-locate in the program management office. Gutierrez completed a program management developmental assignment within the Project Director Joint Services three years ago while she was working as a quality engineer for the Joint Program Executive Office for Soldier. She excelled in the role and was given the opportunity to stay in Project Director Joint Services following the assignment.

Through the developmental assignment, Gutierrez said she truly experienced and learned the world of program management. "These kinds of programs allow engineers to get out of the labs and testing centers and see the impact the work relays to the Army and the warfighters," she said. "However, program management is very demanding and dynamic, you must bring your A-game every day."

The most important lesson Gutierrez said she has learned over the course of her career is to be consistent on a daily basis. "It builds credibility and strengthens integrity… it is important for the team that depends on my work to know that the product provided is of high quality and accurate," she said. "The greatest satisfaction I have as a member of the Army Acquisition Workforce is that I get to be part of and serve the Army family and explore ways to maximize demilitarization."

—HOLLY DECARLO-WHITE

WEATHER THE STORM
Lightning strikes behind a B-52H Stratofortress at Minot Air Force Base, North Dakota, Aug. 8, 2017. In a conventional conflict, the B-52 can accomplish strategic attacks, close-air support, air interdiction, offensive counter-air and maritime operations. (Photo by Senior Airman J.T. Armstrong, U.S. Air Force)

THE LEGEND CONTINUES

Joint effort between the ERDC and the U.S. Air Force means the B-52 will fly on.

by Megan Holland

First introduced in 1955, the Boeing B-52 aircraft has a rich history. The success of a recent effort led by the U.S. Army Engineer Research and Development Center (ERDC) Information Technology Laboratory to facilitate the selection of an optimal replacement for the aging, original engines—deemed unsustainable within the next decade due to a disappearing supply chain—means that legacy will continue.

"The Air Force plans to use the legendary B-52 Stratofortress bomber aircraft through the 2050s and aims to keep the aircraft operational by procuring new engine systems that will replace the engines currently in use across the fleet of aircraft," said IT Lab Supercomputing Research Center COO York Yarbro. "The last B-52 rolled off the production line in 1962, and inventory issues were threatening to ground the fleet."

PRESERVING THE FUNDAMENTAL

In response, the Air Force developed the Commercial Engine Replacement Program to identify a replacement for the legacy engines on the aircraft and, ultimately, extend the B-52 life cycle. The goal was to develop an ecosystem that would allow the use of a digital twin approach to model-based systems engineering (MBSE) and permit a quicker turnaround when conducting evaluations and down-selects. The Air Force also wanted the new engines to be so maintainer-friendly and efficient that they would pay for themselves within 10 years.

"Faced with the challenge of establishing a digital infrastructure that could support rapid evaluations of proposed prototypes prior to physical development, the Air Force turned to" the IT Lab, Yarbro said. "We had experience in designing and deploying virtual ecosystems that support pre- and post-processing of design activities, as well as experience with configuration and version control for fast-running analysis tools." The IT Lab, he continued, "primarily through the [Supercomputing Research Center], brought to bear the ability to integrate a number of tools and configure them for the unique requirements of this effort."

Model-based systems engineering is a method that uses modeling to support system requirements, design, analysis, verification and validation. A foundation of digital engineering for

the Air Force effort begins in the conceptual design phase and continues through development and late life cycle phases. The method is most frequently used when developing and managing systems requirements and enables quicker evaluation of alternative concepts, allowing more models to be evaluated for better informed decisions.

"Once the models become physical artifacts, MBSE data and information (are) still used to manage the life cycle of the device, vehicle, etc.," said Yarbro. "Coupling MBSE with modern data analytics and computing capabilities is viewed by the Air Force as the transformational opportunity of digital engineering, which is part of their digital transformation strategy."

Introducing digital twins, or virtual models, to the model-based systems engineering acquisition design and development phase further increases the number of models that can be developed and evaluated, ultimately boosting the likelihood of success. Digital twins can also be used throughout the development, production, operations and maintenance phases for accelerated risk assessments, predictive maintenance and more.

"The overall impact from the use of digital twins is improved reliability, availability, performance and productivity and, ultimately, better financial decision making," said Yarbro. The IT Lab's "approach to building the ecosystem could be leveraged by a wide-range of MBSE applications to design and build their models to exchange data, just as was done for the B-52 Commercial Engine Replacement Program effort."

ELEMENTS FOR SUCCESS

The ITL team established a digital ecosystem that uses virtual desktop interface and virtual machine capabilities within the SRC to deliver product life cycle management tools and complementary computer-aided design and visualization toolsets in a familiar user interface. These resources were then leveraged by the Air Force to further combine and analyze data while developing inputs to high-performance computing resources to conduct intensive, higher-fidelity modeling of prototypes and the effects of those prototypes on the aircraft.

"According to the Air Force, the replacement engine needed to maintain performance, improve fuel efficiency by 20 to 40 percent, work well with the B-52's unique design, and overcome a variety of additional obstacles," Yarbro said. "They also needed the engines to be compatible with the aircraft's existing systems and sustain current mission capabilities."

Engine makers were confident their commercial power plants could meet the requirements for performance but felt it would be difficult to integrate their commercial engines with the B-52 and adapt them for military use. That meant the digital engineering platform developed by the IT Lab was critical to providing vital data at the speed required to allow the trade-off analysis and decision-making necessary to achieve the program's acquisition milestones—and it did just that.

"In the early stages, the effort focused on data but, over time, additional requirements evolved as essential to improving the value and usefulness of the data," Yarbro said. "The capability we developed is highly valued by our Air Force partners." For the IT Lab, "this is a major success story," he continued. "The customer

EYES ON ENGINES

Airmen assigned to the 307th Maintenance Squadron inspect the running engines of a B-52 Stratofortress for leaks at Barksdale Air Force Base, Louisiana, June 29, 2017. The engine run is one of the final parts of a phase inspection of the bomber, and multiple eyes are needed. (Photo by Master Sgt. Dachelle Melville, U.S. Air Force)

ENGINE CHECK
A U.S. Air Force B-52H Stratofortress bomber assigned to the 307th Bomb Wing goes through an engine check June 24, 2021, at Barksdale Air Force Base. Eight Pratt & Whitney TF33 engines power the B-52H to give it the capability of flying at high subsonic speeds over a range of 8,800 miles with a payload of 77,000 pounds. (Photo by Senior Airman Kate Bragg, U.S. Air Force)

was able to use a functional digital ecosystem in a much shorter time frame than they originally anticipated, enabling them to make their decisions faster."

CONCLUSION

The B-52 Systems Engineering Group believes that the project conservatively saved the Air Force an estimated $10 million, and there are plans to expand the effort to bring the entire B-52 system program office into the environment as a standard tool. For Yarbro, whose father is retired from the U.S. Air Force and once worked on the electronics and communications for the B-52 aircraft, the work has been both rewarding and deeply personal.

"One of my earliest memories is my father taking me to the base where he was stationed, and I saw B-52s taking off and landing," said Yarbro. "I was fascinated then, and I am probably even more fascinated now. It has been a blessing to even be a small part of this project and to feel a stronger connection with him."

For more information, listen to the Power of ERDC Podcast episode 17, "Modernizing the B-52 Through Supercomputing," at ***poweroferdcpodcast.org*** *or contact Megan Holland at* ***megan.m.holland@erdc.dren.mil****.*

MEGAN HOLLAND is the communication officer for the ERDC Information Technology Laboratory. She has an MBA with an emphasis in marketing from Mississippi State University and a B.A. in English and writing from Mississippi College.

ROBIN TITTLE SR.

COMMAND/ORGANIZATION: Chief Information Office, Program Executive Office for Missiles and Space

TITLE: Knowledge management specialist

YEARS OF SERVICE IN WORKFORCE: 11

YEARS OF MILITARY SERVICE: 26

DAWIA CERTIFICATIONS: Practitioner in engineering and technical management

EDUCATION: B.S. in science and associate of science in general education, Troy University

AWARDS: Tennessee National Guard Distinguished Service Medal, Army Achievement Medal, Army Commendation Medal (second award), Meritorious Service Medal (second award), Civilian Service Commendation Medal (second award)

MAKE IT PERSONAL

If there's one thing Robin Tittle Sr. learned during his 26 years in the Army, it is that Soldiers are only as good as their support network at home. "When they don't have that support, you have to fill those shoes sometimes," he said. Tittle practices this philosophy on the job, where he leads a knowledge management team at the Program Executive Office for Missiles and Space (PEO MS) at Redstone Arsenal, Alabama.

Tittle believes in a "team first" management concept. "A person should always look at a project or task in terms of how it will help the team or the organization," he said. "We cannot look at a success as an individual accomplishment, but as a team accomplishment that will help the organization and the warfighter."

How does he achieve this team mentality? By making it personal.

"I strike up conversations, ask my team and colleagues how they are doing and learn about their professional concerns and their families," he said. In simple terms, Tittle shows he cares. "If you don't know people on a personal basis, you can't lead them."

He builds rapport by laughing at himself and not being a roadblock. "I try not to bring my personal problems to work and I do the same thing at home," Tittle said. "I try to separate the two—that's why I've been married for 40 years. When something does happen, I try to make it funny."

He used his camper as an example. During the week, Tittle lives in a 33-foot RV called a "fifth wheel" that he parks at Redstone Arsenal's campground, and he travels home to be with his wife on weekends. "When something frustrating happens at the campground—the toilet backs up, the heater doesn't work or a water hose busts—I try to joke about it with my team and colleagues. If you can't laugh at yourself, you can't laugh at anyone else. People need to be able to laugh at you."

But what Tittle does on the job is no laughing matter. He assists in overseeing a team of six acquisition professionals in the Chief Information Office (CIO) who develop and implement knowledge-management systems and solutions. Knowledge management is the art of creating, organizing, applying and transferring knowledge to facilitate situational awareness and decision-making. PEO MS staff use knowledge management practices and automated systems to assist them in collecting, analyzing, managing and disseminating information, which provides the basis for creating and maintaining understanding within their organizations.

"We support all project offices and Soldiers at PEO MS, providing them with solutions that meet their software use requirements and ensure overall organizational effectiveness," Tittle said, noting his work focuses mainly on operations and administrative functions.

For example, Tittle and his team developed the PEO MS Service Desk application to track task and work orders for the CIO and manage user requests and customer-care-related

MOTORCYCLE ENTHUSIASTS
Tittle and his wife, Jennifer, take a ride on their Harley-Davidson Road King to Tupelo, Mississippi, to visit the birthplace of Elvis Presley. (Photo courtesy of Robin Tittle Sr.)

issues, such as email access and login problems. Staff at PEO MS also use the application to track major projects, generate workflows and manage issue resolution.

Tittle's team also built an in-house application, called Continuous Learning U Registration, that allows personnel to manage their training. Using a single application, the workforce at PEO MS can access a catalog of available courses, register for them and obtain approval for the courses from their supervisors. "This streamlines the effort to offer continuous learning for PEO MS personnel," Tittle said. "This is a great example of how knowledge management keeps everything in one location and simplifies the process for the whole organization."

When Tittle talks about what he and his team do, the thing that most people find surprising is that they have the capability to build software in-house. He leads software developers, database managers and analysts who provide customer solutions. "We try to use existing software to address a problem first," Tittle said. "If that doesn't work, we will try to develop it in-house. Commercial off-the-shelf software is the last resort. Bottom line: We implement the most feasible way to accomplish the task and save the government the most money," he added.

"We have found that the primary reason most organizations are deficient is because they lack proper knowledge. Organizations must have appropriate knowledge about business requirements to be at the top of their game—that's where we come in."

Tittle started out in the acquisition career field supporting NATO's Medium Extended Air Defense System Management Agency, where he was a civilian systems information specialist. He supported computer needs, such as replacement, repair, video teleconferences, graphics and "… anything else [Soldiers] needed done to support the mission," he added. The mission provided threat detection capability for highly maneuverable low-signature threats.

The highlight of this assignment for Tittle was meeting foreign nationals, some of whom shared his passion for riding motorcycles. In his spare time, he rides a Harley Davidson Road King motorcycle with his wife, Jennifer. "She loves to ride anywhere the bike takes us," he said.

And that's exactly how Tittle lives his life, treating each day as though it may be his last. "Say hi and talk to everyone you meet and show them that life is good. "We are not promised the next minute, so enjoy the people you work with and the people in your personal life because they may not be there tomorrow."

—TERESA MIKULSKY PURCELL

The highlight of this assignment for Tittle was meeting foreign nationals, some of whom shared his passion for riding motorcycles.

PRODUCING MODERN AMMO

Holston Army Ammunition Plant manufactures Research Department Explosive and High Melting Explosive for ammunition production. (Image courtesy of JPEO A&A, Project Director Joint Services)

ARMY AMMUNITION PLANT MODERNIZATION PLAN

DOD ammunition production facilities will get critical modernization effort to sustain production.

by Matthew T. Zimmerman and Gabriela Dory, Ph.D.

"You've got to come up with a plan. You can't wish things will get better." —Jack Welch

Facility modernization is critical for sustaining U.S. military ammunition production operations of both legacy and next generation ammunition. The Department of Defense currently has six active government-owned, contractor-operated (GOCO) ammunition production facilities, of which most have been in operation since World War II. As these ammunition plants serve a vital role in protecting the nation's security, developing a long-term modernization strategy is necessary for ensuring the continued success of these facilities in the future.

The Joint Program Executive Office for Armaments and Ammunition (JPEO A&A) at Picatinny Arsenal, New Jersey, produces an annual strategic plan for modernizing ammunition production facilities using "procurement of ammunition, Army" funding. The Army Ammunition Plant Modernization Plan, delivered to Congress in March, provides the management framework for modernization planning, key objectives and end states, project identification and prioritization process, and modernization requirements for each GOCO Army ammunition plant.

SETTING STRATEGIC OBJECTIVES

The strategy centers on meeting the following objectives:

1. Increase manufacturing safety and readiness to meet current and future requirements.
2. Modernize and transform production processes, incorporating best practices from industry.
3. Isolate energetic mass from people.
4. Remove personnel from energetic operations and replace manual operations with automation.
5. Ensure graceful degradation and resilient operations.
6. Design production processes to minimize the concentration of energetic materials in any one place.
7. Incorporate redundancy where possible and practicable.
8. Improve flexibility, maintainability and sustainability.
9. Integrate state-of-the-art technology and equipment.
10. Implement a proactive preventive maintenance program and use predictive maintenance to improve overall system performance and sustainability.
11. Design production lines that can be alternatively used for multiple products with minimum retooling and reconfiguration of the physical system.
12. Reduce cost of operations.
13. Identify processes and equipment that reduce the cost of operating the facilities.
14. Identify efficiencies to reduce labor, material and energy costs.
15. Secure supply chain.
16. Mitigate single point failures.
17. Investigate U.S.-based production and vertical integration.

Each year, modernization projects are prioritized based on scoring calculated from weighted criteria and measured against two factors: first, the significance of mitigating the deficiency or consequence if the project is not executed (i.e., magnitude of the benefit or consequence), and second, the likelihood or probability the benefit or consequence will occur if the project is not executed. These two metrics are multiplied, along with the corresponding scoring criteria weight, and then summed to produce a final score as illustrated in Figure 1, page 104.

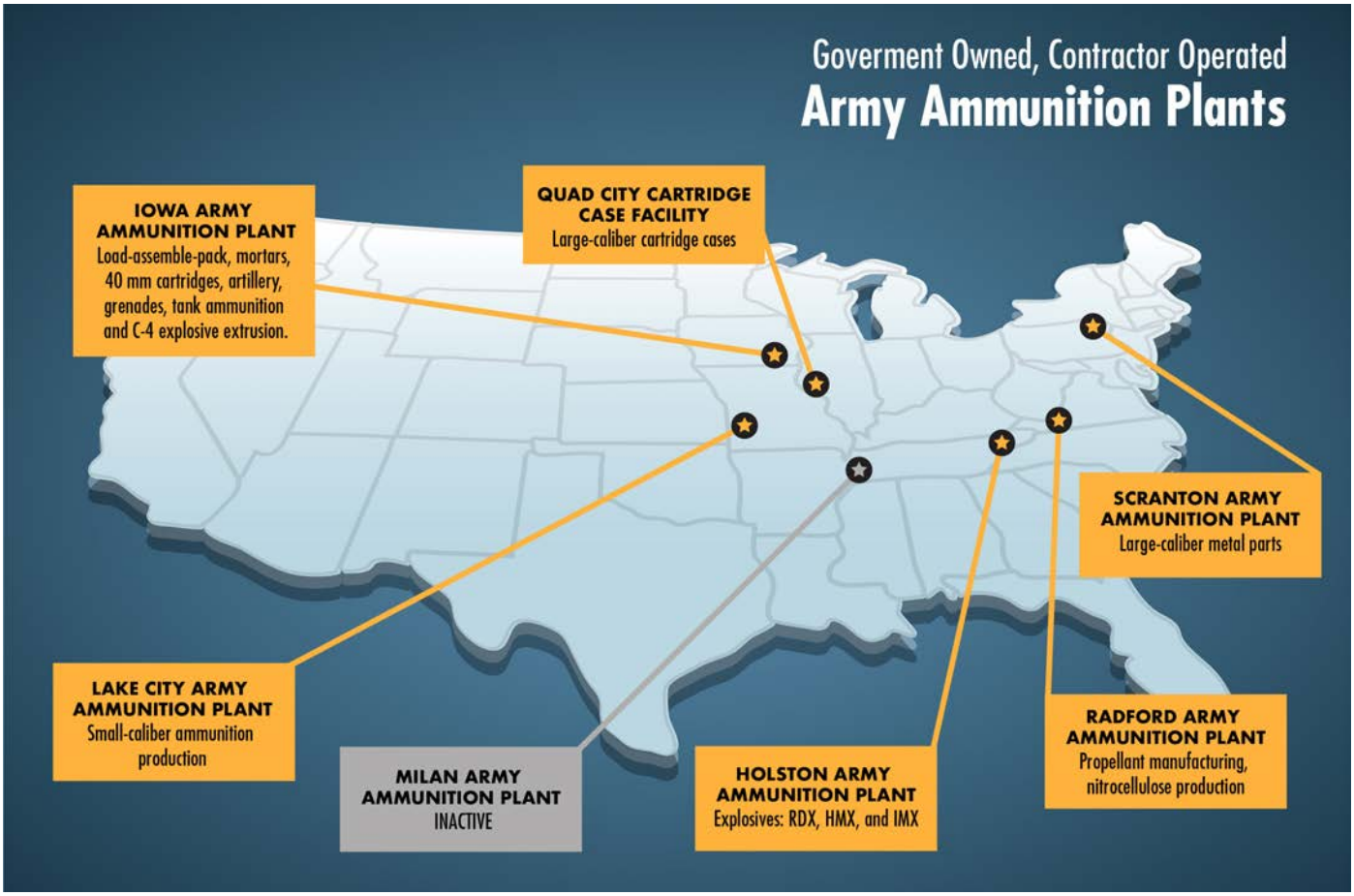
Immediate safety and environmental compliance issues are considered "must-fund projects" and are prioritized above all other projects.

Project ranking is a critical process to ensure that funding is used in the most effective and efficient way possible. More than 100 modernization projects valued at $1.5 billion are in execution,

OUT WITH THE OLD

The new nitrocellulose production facility at Radford AAP in Virginia is scheduled to come online by the end of the year. The new facility will expand the production capacity above current levels, increase operational efficiencies, minimize steam and water consumption, minimize direct-labor utilization thereby improving operational safety, minimize waste streams and emissions, and improve the quality work environment. The new facility will also mitigate the risks of continued reliance on the legacy plant which has served far beyond its original design life expectancy. (Photos courtesy of JPEO A&A)

Construction of new facilities is critical for enabling continued production of ammunition.



AMMO AT WORK

There are six active government-owned, contractor-operated Army ammunition plants in the U.S. undergoing modernization projects. A seventh plant is inactive. (Graphic by USAASC)

and the March Army Ammunition Plant Modernization Plan identified nearly 400 projects valued at over $10 billion.

The Figure 2 graph on page 104 shows historical and projected resourcing for the Army Ammunition Plant Modernization Program to address more than $10 billion in modernization requirements.

Sample Army ammunition plant modernization projects include the following:

- Holston Army Ammunition Plant—Explosives capacity expansion, including new acid, nitration, wash, filter and kettle drying facilities.
- Radford Army Ammunition Plant—Construction of a world-class nitrocellulose production facility. Nitrocellulose is a critical ingredient used in all propellants.
- Lake City Army Ammunition Plant—Design and construction of a Next Generation Squad Weapon 6.8 mm production facility in support of the Army's Cross-Functional Team for Soldier Lethality.
- Iowa Army Ammunition Plant—Design and construction of an artillery melt pour production facility in support of the Army's Cross-Functional Team for Long Range Precision Fires.
- Scranton Army Ammunition Plant—New production lines to support the XM series 155 mm artillery projectiles and Cross-Functional Team for Long Range Precision Fires.

CONTINUOUS IMPROVEMENT

Although the Army's modernization efforts to date have resulted in an improved industrial base, critical infrastructure and manufacturing process upgrades are still required to support the warfighter's ammunition requirements and address the 1940s vintage infrastructure. Such infrastructure is still being used at GOCO Army ammunition plants and is consistently being evaluated for upgrades and reconstruction. Radford Army Ammunition Plant, for example, is undergoing key water infrastructure upgrades to better support current ammunition production requirements and meet the Army's ammunition needs for the future multidomain-operations-capable force. Water is vital to Army ammunition plant operation for acid and materials production, fire suppression and human consumption. Without an adequate supply of water, the Army ammunition plants could not operate. Equally important is the handling or treatment of wastewater. Wastewater must be properly treated to bring it within state and federal water quality standards before discharge. Therefore, water sourcing, use and treatment are crucial infrastructure factors that must be considered to meet future demands.

To support current and future water needs, the Army set out to restore and rebuild the Radford Army Ammunition Plant water supply treatment and distribution system. This project began in 2014 when JPEO A&A first began assessing Radford Army Ammunition Plant's water demands and water supply treatment, manufacturing and distribution infrastructure. Based on this data, JPEO A&A then developed a water utility restoration strategy that would meet future operational requirements in compliance with federal, state and local regulations, including the 1972 Clean Water Act provisions and those provisions set by the Virginia Department of the Environmental Quality governing intake velocity (a velocity below 0.5 feet per second reduces mortality rate for local aquatic life and helps to maintain a healthy ecosystem).

Specific upgrades to the new raw water intake system included new electrical controls and wiring; four new high-efficiency pumps; new piping; new raw water mains; self-cleaning strainers; cone check valves; throttling, isolation, and safety

FIGURE 1

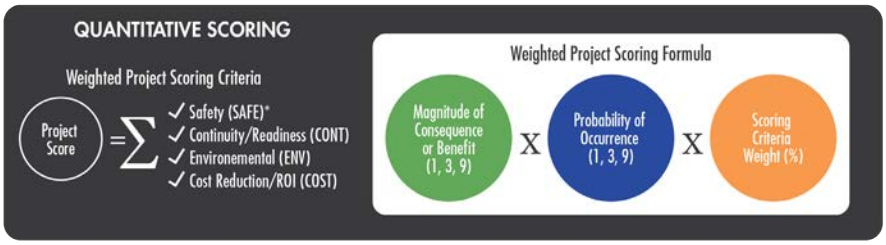


FIGURE 1: QUANTITATIVE SCORING

Projects prioritization is based on scoring calculated from weighted criteria measured against two factors, then multiplied along with the corresponding scoring criteria weight, and then summed to produce a final score. (Graphic courtesy of JPEO A&A)

FIGURE 2

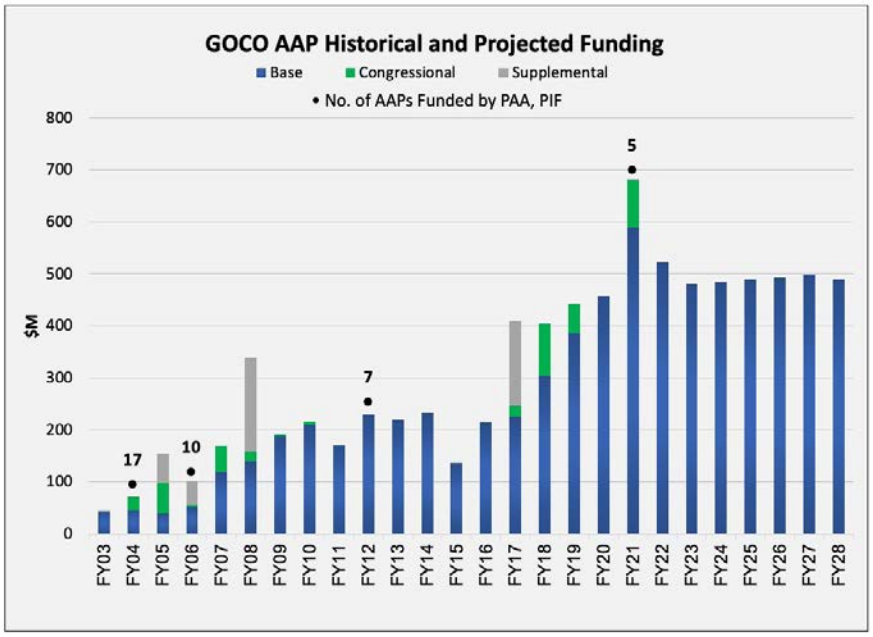


FIGURE 2: GOCO AAP FUNDING

Graph shows historical and projected resourcing for the Army ammunition plant modernization program to address over $10 billion in modernization requirements. (Graphic courtesy of JPEO A&A)

Without an adequate supply of water, the Army ammunition plants could not operate.

valves; new motors; variable frequency drives (for pump motors); motor control center with switchgears; and new flow meters. BAE Systems completed this $17.8 million upgrade in March.

It is critical for facilities to meet ammunition production requirements while ensuring workforce safety, especially for those involved in inherently dangerous explosives operations. Recent years have seen a significant amount of modernization funding aimed at recapitalizing the Army ammunition plants. In these aging facilities, unique equipment used for explosive and energetic materials is experiencing unplanned downtime or even obsolescence because it has aged beyond the point where maintenance can ensure production continuity. Therefore, construction of new facilities is critical for enabling continued production of ammunition.

This is especially evident at Holston Army Ammunition Plant in Tennessee where a recent expansion project will upgrade and rebuild multiple explosives production processes for the increased production of RDX—the most commonly used synthetic chemical compound that can be used as a base charge for detonators among other uses—and HMX, which explodes at temperatures above 534 degrees. Improvements include a new nitration facility where crude explosives are generated, a new melt-cast facility for the manufacture of insensitive munitions explosives formulations (munitions designed to withstand shock from adjacent detonating munitions) and a new kettle drying operation, which will increase drying capacity for CMX-7 a premix for PBXN-107 (a plastic-bonded explosive), bomb fill, as well as other explosives.

CONCLUSION

Increased funding levels required to maintain the Army ammunition plants is necessary based on production requirements and the amount of recapitalization needed to modernize these facilities for the future. Impacts from global events, supply chain disruptions and inflation have made strategic planning and reliable budget estimating more important. The Army ammunition plant modernization plan provides a strategic investment strategy to ensure ammunition manufacturing readiness now and in the future.

For more information, contact Matthew T. Zimmerman, ***matthew.t.zimmerman2.civ@army.mil****.*

MATTHEW T. ZIMMERMAN supports the JPEO A&A Project Director for Joint Services. He is responsible for an annual procurement and research, development, test and evaluation budget for the GOCO Army ammunition plant acquisition strategies and modernization program, demilitarization program, manufacturing technology and prototyping activities, and integrating the DOD's Single Manager for Conventional Ammunition responsibilities. He has a master's in engineering from Stevens Institute of Technology, a master's in technology management from the University of Pennsylvania's Wharton School & Moore School and a B.S. in mechanical engineering from the Pennsylvania State University. He has completed the Harvard University John F. Kennedy School of Government program and the Defense Acquisition University Senior Service College Fellowship. He is a certified Lean Six Sigma Black Belt and holds the DAWIA Advanced program management certification.

GABRIELA DORY, Ph.D., supports the Project Director for Joint Services. She has over 15 years of civil service with the U.S. Army supporting research, development, test and evaluation, acquisition and program management for the industrial base, including expertise in environmental permitting and production base management support. She has a Ph.D. in environmental science from the New Jersey Institute of Technology, an M.S. in environmental and waste management from Stony Brook University and a B.S. in biology from Union College.

HANDS-ON EXPERIMENTATION
DOD STEM K-12 cadets conduct "PackBot" velocity determination experiments at a STEM Day camp Aug. 5, 2021, at Fort Custer, Michigan. (Photo by Jerome Aliotta, DEVCOM Ground Vehicle Systems Center)

STAYING THE COURSE

Greg Chappelle has been running STEM programs with underserved populations before the rest of the world knew what STEM meant. He's not giving up efforts to keep the Native STEM program afloat, even when funds run out.

by Cheryl Marino

When you don't have enough of something, the way that DOD doesn't ever have enough science, technology, engineering and math talent, it can pay to grow your own. That's just what the Ground Vehicle Systems Center's Greg Chappelle has been doing the last 28 years. He almost lost it all when funding ran dry, but he isn't the kind of person that gives up easily.

Chappelle believes good talent is out there, it all just depends on where you look, what your resources are and how you go about your search. So, for nearly three decades, he has done whatever it takes to preserve a specialized program he founded called GLRTN DOD STEM K-12, the short version of the Great Lakes Region and Tribal Nations DOD Science, Technology, Engineering and Math K-12, which he has led and managed since 1994.

The goal of GLRTN STEM—an offshoot of the DOD STEM program—is to bring accessible, educational science, technology, engineering and mathematics (STEM) summer camps to children in Native and Indigenous communities in the Michigan area. Teaming up with Native American communities, Wayne State University and, more recently, Harvard University to expand outreach efforts, Chappelle hopes to create a talent pool equipped to serve the nation and evolve DOD's competitive edge. Because of pandemic restrictions, the program has now gone virtual, but it never lost momentum. If anything, the shift to remote learning has brought surprising success with the opportunity for even greater outreach.

Chappelle is currently the DOD STEM coordinator and the Historically Black Colleges Universities and Minority Institutions (HBCU/MI) liaison officer at the Combat Capabilities Development Command (DEVCOM) Ground Vehicle Systems Center in Warren, Michigan. He started the program with a little funding and a lot of determination. In 2010, when program funding ran out, he wasn't about to give up. Instead, Chappelle ramped up his outreach efforts. As a result, the Ground Vehicle Systems Center has been working directly with multiple tribal nations

TEN…NINE…EIGHT…
Cadets prepare to launch water rockets at a STEM Day camp Aug. 5, 2021, at Fort Custer. (Photo by Jerome Aliotta, DEVCOM Ground Vehicle Systems Center)

to sponsor DOD STEM K-12 summer camps on tribal lands, opening doors to new educational opportunities for Native and Indigenous students in underserved communities in the Michigan area. Those nations include Lac Vieux Desert, Keweenaw Bay Indian Community, Bay Mills Indian Community, Hannahville Indian Community, Pokagon Band, Navajo, Apache, Chickasaw and Lac Du Flambeau.

KIDS DESERVE A CHANCE

"This program was needed. So I had that vision," said Chappelle, who is both African American and Native American (of the Seminole Tribe, Florida). Chappelle can relate to the needs and circumstances of kids raised in impoverished and underserved communities. Despite growing up in the "hood of Detroit," he took advantage of opportunities available to him and earned three bachelor's degrees, two master's, his teaching certificate and credits toward his doctorate—in the fields of chemistry, physics, electrical engineering, mathematics, history, sociology and English. But primarily, he said, he's an educator who believes in sharing knowledge he's acquired through personal experience.

"When I first started the program, I thought it might not be as important now, but it will be one day. In our society there are all kinds of diversity, ethnic and cultural issues, but we all have to work together at some point." With heightened government focus on equity in the last two years, he said in a June interview with Army AL&T, the timing is right to increase outreach efforts and boost enrollment in DOD STEM. There are now 574 federally recognized Native tribes in the United States, and Chappelle is responsible for coordinating with 40 of them.

Much like the DOD STEM program mission to "inspire, cultivate, and develop exceptional STEM talent through a continuum of opportunities to enrich our current and future" workforce, Chappelle's homegrown STEM program was designed in the form of a K-12 camp series and one Saturday a month.

It's Chappelle's contention that "kids of all cultures and ethnicities who have potential—from the most financially disadvantaged areas with the highest crime and special needs, as well as Native American and Indigenous kids—should all be given an equal chance to succeed." But since Native American and Indigenous students are underrepresented in STEM, this STEM program is intended to combat disparities between the opportunities extended to the general population and those geared toward these underserved Native communities with unique educational challenges. It is also intended to attract those with talent to the future DOD workforce. According to Chappelle, "If this program is allowed to continue, we will be producing a great diversity of scientists and engineers for the defense of the nation."

MUST-HAVE METRICS

For years the GLRTN STEM program operated with a small funding line furnished in part by the DEVCOM Ground Vehicle Systems Center HBCU/MI program. Once funding ended in 2010, Chappelle sought—and received—grants from the Office

"If you don't expose kids to these things, you end up with a vanishing number of people becoming scientists."

STEM DAY UNDERWAY

Greg Chappelle, left, with cadets at a STEM DAY camp Aug. 5, 2021, at Fort Custer. At these camp sessions, kids are encouraged to explore their interests in the fields of science, technology, engineering, art and math. (Photo by Jerome Aliotta, DEVCOM Ground Vehicle Systems Center)

of the Secretary of Defense (OSD) to keep the program going, however, he knew he'd need to find a way to keep the momentum for the long term. "In order to get more funding for the program, the OSD needed some metrics to show data on how their investment was working," he said. Although it was a reasonable request, showing hard statistics was no easy task. So he consulted with the National Science Foundation. The NSF suggested there would only be "longitudinal results" with this kind of study. In other words, he chuckled, "you won't know the results until 20 years from now, when the kids grow up, graduate and go into their careers, which would be a long wait."

But Chappelle has been with the DOD for 40 years. He knows the drill—so to speak. The only real way to measure the program's success rate was to seek outside assistance in developing metrics. So he sought support from Harvard University, which "promotes university-wide engagement with Native American and Indigenous issues . . . through relevant research, teaching, partnership and exchange" through its Harvard University Native American Program (HUNAP). The overall goal of HUNAP is "to cultivate the development, achievement, and impact of American Indian, Alaska Native, Native Hawaiian, and other Indigenous students to further the goals of the Harvard Charter of 1650, which committed the president and fellows of Harvard College to "the education of the English and Indian youth of this country."

OBVIOUS BENEFITS

The Harvard assessment compared the grade point averages (GPAs) of the kids who attended the GLRTN STEM camp for eight or nine years against those who never attended at all to get an idea of the differentials. According to Chappelle there was "a pretty significant difference." The kids who enrolled in the camp had a 3.43 GPA average, as opposed to a 2.94 GPA for the kids who didn't. In addition to GPAs, he said "The kids that enrolled in the camp and were trained by us had direction and a clear career path, and the kids who didn't enroll had little to no direction and were undecided in their major."

The metric assessment showed obvious benefits, and Chappelle is hopeful that funding will continue for the program to flourish. He said to date he's received funding every few years to keep the program afloat, but the struggle is ongoing. In 2010, the OSD issued a $400,000 grant to continue funding the GLRTN STEM program. Subsequent grants followed

in 2013 for $300,000 and another in 2019 in the amount of $265,000.

"Basically, grants have totaled around $1 million in the last 12 years, but since 90 percent of the budget is administrative, we're saving the OSD millions of dollars [going virtual] moving the program to Zoom," he said. Not only has the shift to a virtual curriculum saved money, but it also has a greater outreach.

A DECENT PROPOSAL

Since its inception, the GLRTN STEM program had mainly been conducted in-person through summer camps until the pandemic posed new challenges—and unexpected benefits. The switch from traditional, in-person courses to virtual instruction may have lost that personal touch but ended up with significant cost savings and a wider reach.

Chappelle said the biggest challenge with virtual learning is that you can't build anything like you can in an in-person outdoor setting or a classroom. "But on the flipside, you can reach 800 more people for 90 percent less money" in a virtual setting, he said. As an example, adding a teacher who would have been paid thousands for in-person instruction could now be paid a lot less per hour for a Zoom class. According to Chappelle, "DOD STEM K-12 teachers with salary and TDY [temporary duty station] costs are paid about $2,500 per week [in-person instruction] versus $40 per hour for three hours of Zoom time and $35 [per hour] for three to four hours of Zoom teaching preparation time." So for a virtual summer camp of two days versus a five day in-person on site summer camp teachers make $380 versus $2,500.

"When COVID diverted the Army and Tribal Nations to Zoom, we partnered with Wayne State University, and now the GLRTN STEM program has K-12 students nationwide virtually attending these educational Zoom sessions," Chappelle said of the next-generation virtual camp initiative.

"If this program is allowed to continue, we will be producing a great diversity of scientists and engineers for the defense of the nation."

To move the program forward, assess its effectiveness and gain additional funding, Chappelle worked alongside Aaron Tadgerson, Bay Mills Indian Community and DOD Native liaison, and Sandra Yarema, Ph.D., a professor at Wayne State University and the regional director of the Army Junior Science and Humanities Symposium (JSHS) to submit a case study proposal to Harvard University's Native American Program Office and Education Department. The proposal was accepted and taken on by Harvard as the Bay Mills Indian Community (Ojibwa), DEVCOM GVSC, Wayne State University and Harvard University DOD STEM K-12 Tribal Nations Outreach Project.

A LITTLE HELP FROM HARVARD

In the spring of 2020 when the "pandemic disrupted everything," said Eric Henson, a professor at the Harvard Kennedy School of Government in Cambridge, Massachusetts, Henson and his students eagerly accepted the proposal and took on the project to assist with DOD's outreach assessment mission. Henson, a citizen of the Chickasaw Nation and a research fellow affiliate with The Harvard Project on American Indian Economic Development since 1998, teaches a course called Native Americans in the 21st Century: Nation Building II—a semester-long project that pairs graduate students with seven different tribal entities to participate in outreach and raise awareness about educational and career opportunities outside of their communities.

"We're driven by the Native community, focus on what problems they have and ask, 'How can we help?'" said Henson, who teaches virtual classes via Zoom to his graduate and undergraduate students, as well as Native K-12 students. "If you don't expose kids to these things [math, physics and science], you end up with a vanishing number of people becoming scientists. If you could get a dozen people in junior high school interested, and then another half to enroll, and then another half to graduate, that's a big accomplishment," he said in an interview with Army AL&T.

Henson's 10-year-old son adjusted well to remote learning. Henson added that, although the classroom setting has its benefits, the virtual experience can be even more engaging for kids than in-person instruction when they can visualize more things at one time or in a shorter amount of time than if they were to physically get on a bus and experience one place at a time. The virtual option has afforded the opportunity for wider outreach, which is advantageous for the future of the program.

Since Henson and his students' involvement, much of the program's outreach has been done online and through social media, which he tepidly suggested is a "work in progress." The social media outreach to K-12 students has been initiated but,

he said, getting exposure and building a following will take some time. "Media presence isn't easy. STEM camps just started to take this on, but it's going to need some work as far as getting a lot of hits—and will need to be promoted right to get some interest. The Native communities themselves will need to cooperate in getting the word out to their communities, too," Henson said.

Outreach aside, he said that the biggest challenge for the GLRTN STEM program is how to best capture a kid's attention on a Saturday morning. "You have to be interactive and really keep them interested. Getting teachers that are interesting is also a huge challenge for keeping younger people focused and involved in a virtual setting."

NATIVE COMMUNITY OUTREACH
As part of the Harvard and DOD GLRTN outreach project, a flyer for DOD STEM K-12 virtual learning sessions for sixth- to ninth-grade students was advertised to Native and Indigenous populations and posted on social media to get the word out to Native communities. (Image courtesy of Bridget Chemberlin, Harvard University)

CONCLUSION

The DOD partnering of resources with other agencies and academia would ultimately drive college enrollment and add talent to the workforce. "Harvard has a great interest in attracting Native students and helping them succeed and foster brotherhood and sisterhood once they get here," Henson said enthusiastically. "It's interesting stuff, and I think it's just great to be able to help Native students who didn't think they'd ever be able to go to Harvard to get involved with math and physics," he said of the university's program and GLRTN STEM. "It's important for them to know these opportunities are out there for them, and if you have the grades and your family makes under [$75,000] a year, there's a place for you here, you can do it."

Henson said that Harvard didn't "move up to its charter," or in other words, legislate in accordance with its defined rights and privileges (to further the goals of the Harvard Charter of 1650) until 1970 when the American Indian Program (AIP) was established at the Harvard Graduate School of Education to prepare American Indians for leadership in education. He said, initially, AIP enrollment was 11 Native American students, which was the largest Native enrollment since the mid-1600s when the university opened. By 2021, Harvard had more than three dozen Native graduates.

"This is a great success for Harvard," he said. And he can't see any reason why the GLRTN STEM program wouldn't see the same success in years to come, especially now with the virtual option. But it will take time to recognize how successful the program will be going forward—how many kids graduate, go on to colleges and universities of their choice and settle into their careers.

"How do you define success?" Henson speculated. "If you are making sure students have exposure to everything so that you get a diverse set of brilliant graduates entering the math and science fields, that's success. The world cannot exist without highly skilled mathematicians, physicists and scientists. You have to find a way to expose all kids, especially Native kids, to all that there is to offer so they have a chance. You can do these camps from anywhere and you'll have success."

For more information contact ***gregory.a.chappelle.civ@army.mil*** *at DEVCOM Ground Vehicle Systems Center or go to* ***https://tinyurl.com/DoDSTEM-Camps*** *and* ***www.go.wayne.edu/jsh-symposium****. On Facebook or Twitter, go to @glrtndodstemk12.*

CHERYL MARINO provides contract support to the U.S. Army Acquisition Support Center at Fort Belvoir, Virginia, as a writer and editor for Network Runners, Inc. and Army AL&T magazine. She holds a B.A. in communications from Seton Hall University and has more than 20 years of writing and editing experience in both the government and commercial sectors. In addition to corporate communications, she is a feature writer and photojournalist for a biannual New Jersey travel magazine.

FROM THE DIRECTOR OF
ACQUISITION CAREER MANAGEMENT
RONALD R. RICHARDSON JR.

THE ARMY ACQUISITION WORKFORCE OF THE FUTURE

Almost three years ago, everything changed. Our organizations sent people home to telework full time for what many thought would be a short-term situation, which has since turned into a complete revision of how we do work across the Department of Defense and the U.S. Army.

I'm the type of leader who prefers to lead by walking around. I see value in knowing when and where people are working. I gain a lot of insight from stay-behinds with my colleagues after meetings. I appreciate the head nods and smiles I would get when speaking to a larger group of people. I also think the era of spending five days a week in the office is behind us, and we're moving into a new environment of hybrid workplaces and flexibility—and I'm looking forward to it.

RELATIONSHIPS ARE KEY

The relationships established among our workforce before COVID-19 hit were key to our success in those first few months of the transition to full-time telework. We didn't have all the tools we needed—we attempted conference bridges and virtual meetings but lacked enough VPN ports—but we were all in this together, working for an organization that had an established ethos with people we knew and trusted.

As time went on, people moved on and new people were brought into the organization—new people who have yet to be assigned a cubicle and have never shaken their teammates' hands. As a leader, I was challenged to figure out how to bring them into the organization and foster those relationships.

That's where Microsoft Teams came into play. Microsoft Teams was a game changer. It allowed me to check in on my people, to see them and establish that sense of community. It gave me that face-to-face capability. As Timothy James Keilty and John Z. "Jack" Burke wrote in "Chat Me On Teams," a recent Army AL&T article, "The chat, group chat and file-sharing functions of Microsoft Teams provide the means to keep the conversation alive in a telework environment. It is how people get real-time updates; more importantly, you keep the entire team in the conversation. It is how you poke your head into someone's cubicle in a telework environment."

A NEW NORMAL
Younger workers expect a workplace culture that includes telework. (Photo by Getty Images)

I'm a big proponent of all that Microsoft Teams has brought to our workforce, and how it has enabled us to continue to build and strengthen our relationships.

EMBRACING FLEXIBILITY

Before COVID-19, telework was seen as a luxury oftentimes out of reach for many in our workforce. Now we're seeing a discussion around the expansion of remote work and increased flexible work schedules.

DOD and Army senior leaders recognize the tremendous accomplishments that have occurred in this recent full-time telework environment. As we've invested in tools like Microsoft Teams and are realizing cost savings from reduced leased space and transportation subsidies, leadership is taking those lessons learned and implementing them into what will look like a hybrid work environment for many.

Within the U.S. Army Acquisition Support Center, we're re-looking across the organization to determine which positions, based on position description, roles and duties, may lend themselves to remote work. I believe it's important to do an honest and fair review of the position description to determine if making the position remote makes sense and truly doesn't require time in the office. For some jobs, like those in a headquarters that require interaction and transactions, remote might not make sense. Whereas fielders and equipment trainers, who travel most of the year, just need to be close to a major airport. Remote work has proven benefits. For example, a two-year study found that U.S. Patent and Trademark Office staff who were allowed to work from home and work from anywhere were 4.4 percent more productive than their in-office counterparts. As a leader, I'm committed to supporting what makes sense for the position and the organization.

Traditional work schedules also have seen a shift. What was clocking in and out of the office each day has blurred as folks "commute" to their kitchen tables. Working in the D.C. area, long commutes have always been a challenge. Now, many of my employees are getting two or three or even more hours back—hours they would have spent in the car, on the Metro or train. They're starting work earlier or finishing up later. They're able to be there when their child gets home from school, or easily

TELEWORK TIPS
Optimizing the telework experience is key to productivity. (Graphic by USAASC)

attend routine medical appointments. Flexible work schedules require managers to focus on measurable and objective performance. Their success is based on clear communication, trust and professional respect.

21ST CENTURY LEADERSHIP

It's time we evolve and have our workplace practices join the 21st century. Workplace cultures that include telework, remote work and flexible work schedules are what the newer generations don't just look for in a job, but expect.

These workplace benefits will place DOD and the U.S. Army as employers of choice. Good work-life balance is shown to greatly impact recruitment and retention in addition to improving employee morale. But we need to ensure our leadership practices evolve, too.

Embrace Technology. Telework is here to stay. Leaders must get comfortable with tools like Microsoft Teams. That means establishing reasonable and manageable schedules, and being transparent. Leaders also need to set boundaries and encourage employees to disconnect.

Equal Opportunity. While more employees become remote, leaders need to make sure those same employees remain active participants within the organization. There could be a perception that those in the office have the benefit of additional knowledge, which could lead to lower morale and angst amongst those not in the office. Leaders need to be thoughtful and deliberate in making sure the hybrid workplace remains equitable.

People First. Our top priority must remain protecting and taking care of our people, as it is the people who accomplish our mission. While employees are more productive since being able to telework, many are working more outside of traditional office hours and on weekends, putting in longer hours because it's harder to unplug. As we continue to deal with COVID-19, leaders should be thoughtful of safety and the mental and physical toll the pandemic has had on many employees. We should continue to check in on each other, leverage wellness programs and promote community.

We're transitioning to our new normal, which will require creative thinking and consideration. Success in this new hybrid environment will take a little more deliberate planning, but it will be so worthwhile.

CAREER NAVIGATOR

CREDIT WHERE IT'S DUE

Credentials help acquisition professionals to tailor their education and training to their careers, but credentials are not the same as certifications.

by Jacqueline M. Hames

Lifelong learning is the backdrop for the Back-to-Basics acquisition framework. The ultimate goal is to have a workforce that is highly trained and skilled, and constantly learning the latest information and best business practices for each functional area (previously called career fields).

Back-to-Basics is "the best example of continuous learning intent that I've seen in my career, and that is largely because of credentialing," said Scott Greene, chief of the Strategy and Communications Division at the Army Director of Acquisition Career Management (DACM) Office. Credentials are focused functional blocks of training—they are separate from, and not required for, functional area certifications.

In the past, the acquisition community struggled with training that was "front-loaded," meaning that employees received required training all at once. Training often included knowledge or skills that weren't necessary or wouldn't be put to use until much further along in a career. However, the Back-to-Basics framework seeks to remedy that issue with less upfront training and more time to accomplish it. There is also an abundance of as-needed training through defense acquisition credentials, largely focused within a functional area.

"With Back-to-Basics, we lessened the overall certification training requirements to make it more tailored and focused," Greene said. "The tailored part comes in with credentials, which is really that supplemental, functional-area-specific training that's really necessary—but not required—for you to be an expert in your position."

While credentials are not required at the DOD level, supervisors, component or functional-area leaders can direct acquisition professionals to acquire them for their position.

HOW WE GOT HERE

"Back-to-Basics is a movement, not a moment," said Scott W. Bauer, director of acquisition human capital initiatives (HCI) at Defense Acquisition University (DAU). Updating the framework was a once-in-a-generation event, he said—the last time it was updated was 30 years ago. During the implementation

of Back-to-Basics, HCI staff managed union obligations, undertook policy revisions to synchronize law and policy, and were ambassadors in the strategic communication campaign. HCI was formerly a direct report to the Office of the Undersecretary of Defense for Acquisition and Sustainment but, as of May 2021, "grew roots" with DAU and now falls under its purview.

"At the strategic level, Back-to-Basics puts the learner in the driver's seat," Bauer said. "This will require individuals to be more intentional about their training." Acquisition workforce members, in communication with their supervisor, will need to make determinations about what training or credential to take next, he explained.

Aaron Hutson, chief of strategy and policy at the DACM Office, emphasized that Back-to-Basics is a big culture shift. "[We're] trying to instill a culture of lifelong learning and continuous learning at the point of need. Then, trying to push that to the workforce, to our supervisors, to be mindful of that," he said.

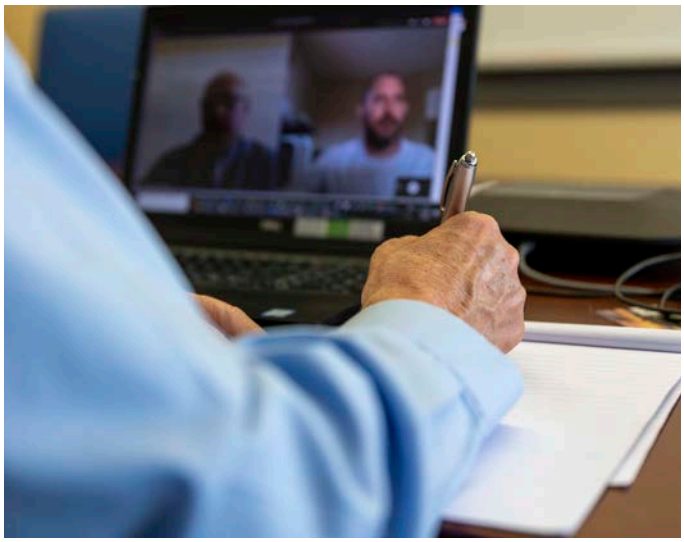
WHAT'S A CREDENTIAL?

A credential—or, more formally, a defense acquisition credential—"documents the knowledge, skills and abilities to perform a DOD acquisition-related function, skill or set of tasks," according to DAU. They provide the workforce with in-depth training for a singular functional area as well as cross-functional training for several functional areas.

"The main difference between DAWIA [the Defense Acquisition Workforce Improvement Act] certification and the Defense Acquisition Credential Program is that certification is required by law and policy, while credentials are not," Bauer said. Credentials were initially created as a set of requirements determined by the functional area leads to address specific functional area needs or gaps. "Currently, DAU has deployed more than 40 credentials in a range of areas," Bauer said.

Earning a credential means that an acquisition professional will complete several courses that comprise the credential's requirements. According to the DACM website, members have one year from enrollment to complete the components of a credential. Once all the components are complete, the credential's validity starts, and usually lasts 3 to 4 years before needing to be renewed, according to the DAU website. The renewal period is about six months, during which the student must complete the renewal requirements to maintain the credential.

These credentials are intended to enhance a workforce member's knowledge of a



CLOSE RANGE
Virtual instructor-led training is one of several learning-delivery options in the Back-to-Basics training portfolio. Virtual instructor-led trainings have enrollment limits based on demand. (Photo by Michel Sauret, U.S. Army Corps of Engineers Pittsburgh District)

GROUP SETTING
Instructor-led training is one of the learning delivery options DAU offers in its training portfolio. Back-to-Basics lessens the overall certification training requirements to make training and education more tailored and focused. (Photo by Getty Images)

PERFECT PAIRING

The Naval Postgraduate School's 2021 fall quarter graduation ceremony was held on Dec. 17 in King Hall Auditorium. The Army partners heavily with the Naval Postgraduate School—where officers are often sent for an acquisition-focused technical master's degree, with DAU-equivalent training mixed in. (Photo by Javier Chagoya, U.S. Navy)

particular functional area—either through a broader understanding of the functional area, or specific expertise in one aspect of the functional area. They complement the functional area's basic training requirements and allow employees to spread their training out over time so that skills and knowledge, once acquired, can be implemented immediately.

COURSES AND CREDENTIALS

DAU has several "learning delivery options" in its training portfolio: instructor-led training, virtual instructor-led training or online training, Hutson explained. Online training is self-paced and may include videos and other tools. "Most of the credentials are online training," Hutson said. "Somebody registers for the credential, but then they must also register for each individual course within the credential." The virtual instructor-led training and instructor-led trainings have enrollment limits, based on demand. People wanting to enroll, he said, should do so as soon as possible.

This culture of "continuous learning may involve more 'elective learning' that may take the shape of expanded learning modalities," Bauer said. "For example, traditionally I may have taken a course to learn about additive manufacturing. But now I may be able to participate in a workshop, listen to a podcast or watch a video to gain the same understanding at a time that works best for me," versus only taking a structured course. There are more learning tools available to accommodate students' different styles of learning.

For those with acquisition-coded jobs, credentials also earn members continuous learning points (CLPs). CLPs—required for all employees whose jobs are coded as acquisition—may be

CLP Cycle Reset

The CLP cycle begins again soon for those whose jobs are classified as acquisition under DAWIA. The new cycle will run from Oct. 1, 2022, to Sept. 30, 2024. Points from the last cycle do not carry over. Everyone begins at zero and, over the next two years, will need to earn 80 CLPs. Be sure to add creditable courses to your individual development plan on the Career Acquisition Personnel and Position Management Information System (CAPPMIS), so that CLPs can be tracked.

The CLP "notional glide path," a recommended pace for earning CLPs, is available on the DACM website. Go to **https://asc.army.mil/web/clp-glidepath.**

courses, professional activities or professional experience. That can include authoring an article in a professional publication such as Army AL&T magazine. The policy on continuous learning for the defense acquisition workforce requires that each workforce member (military and civilian) earn 40 CLPs every year, and 80 CLPs being mandatory within two years.

DAU breaks down CLPs for credentials into three parts: DAU course requirements, other credential requirements and completing the credential itself. The workforce can earn CLPs not just for the actual credential, but also for a course within the credential's requirement. "You don't have to focus all of your 80 hours on credentials. It's just a perfect opportunity and way to meet that intent," Greene said.

ADDITIONAL AVENUES

"Anyone needing or wanting training that's either required or desired from Defense Acquisition University has three methods to take it," Greene said—through DAU, through an equivalent provider, or via fulfillment, which enables individuals to demonstrate in writing how they believe they have met the course learning objectives through their education, training and experience.

Bauer said that if an acquisition professional who believes previous training, education or experience meets a specific course's objectives, that person can submit a fulfillment package within their organization—if it meets the criteria, then the professional may receive credit for the DAU course. "There are also agreements with some universities, colleges and commercial entities to provide equivalences for DAU courses," Bauer added.

> Credentials are focused functional blocks of training—they are separate from, and not required for, functional area certifications.

"The Army, for example, partners heavily with the Naval Postgraduate School," Greene said. "It's where we send a good amount of our officers for an acquisition-focused technical master's degree. So when our officers go there for that, they're also getting a lot of DAU equivalent training mixed in."

CONCLUSION

As the Back-to-Basics movement unfolds, the intent is that the workforce will be able to grow and expand with it.

The culture of continuous learning "puts the onus on the individual and the supervisor to identify which credentials [the employee] should take," Greene said. It is incumbent upon them to become more knowledgeable within their functional domain. CLPs help workforce members to stay on track and take advantage of this new learning framework. The expanded timeline for certification within a functional area allows individuals to take the training they need when they need it, he explained.

"I think it's a really good opportunity for the workforce to free themselves up a little bit, to own their piece of the pie and their learning at the right time," Hutson said.

For more information on the Back-to-Basics framework, go to ***https://asc.army.mil/web/dacm-office/back-to-basics****.*

JACQUELINE M. HAMES is an editor with Army AL&T magazine. She holds a B.A. in creative writing from Christopher Newport University. She has more than 10 years of experience writing and editing news and feature articles for publication.

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THE PROPER TOOLS

The MSL degree program provides Army Acquisition Workforce members with the tools to think more critically about the acquisition process, advance expertise and become more persuasive influencers. (Image by Shutterstock)

FIRST IN CLASS

The first to complete her MSL degree in the pilot cohort of the DASA(P)-sponsored program at GW Law explains the program and why she wanted in.

by Corey L. Richards

In June 2020, the Office of the Deputy Assistant Secretary of the Army for Procurement (ODASA(P)) announced a new competitive pilot program whereby permanent Army Acquisition Workforce members could obtain a Master of Studies in Law (MSL) in government procurement law from The George Washington University Law School. As a contracting adviser, I couldn't wait to apply.

My job, supporting the Next-Generation Combat Vehicles Cross-Functional Team (NGCV CFT), is one in which knowledge of government procurement law is paramount to my organization's ability to modernize the Army faster than its adversaries. As such, I was interested in the program because I wanted to expand the breadth and depth of my awareness of government procurement rules and procedures so I could be a more valuable contracting adviser.

I saw this degree program as one that would give me the tools to think more critically about the acquisition process, advance my expertise and become a more persuasive influencer toward accepting some procurement risk in exchange for an even greater reward.

The Army must better analyze its options and assess the risks if it aims to modernize how it contracts for supplies and services. Too often, the acquisition community recycles the procurement approaches they've "always used" out of ease and comfort, rather than taking the risk to try something different to reduce cost, improve schedule or increase performance capability. I was eager to connect with GW Law professors and students in various other acquisition roles to better navigate a path to changing the common risk-averse culture within the acquisition community.

The skills I acquired from the MSL program have allowed me to advise more dynamically than I could previously.

In August 2020, I was one of eight people selected to participate in the Army's first civilian cohort. Unlike other government-sponsored academic degree training programs (the Naval Postgraduate School, for example) where students can spend a portion of their duty week attending classes, MSL program coursework is completed solely on off-duty time. Meaning, employees must continue to work full time and take courses in the evening or on weekends. Despite the challenges balancing school, work and family, in May I was the first to complete the 24-credit-hour program.

REAL-LIFE CRITICAL THINKING

The MSL program went beyond advancing my ability to examine government procurement rules and procedures in context with policy analysis. It also matured my critical thinking skills, improved my writing, and—perhaps more importantly—enlarged and diversified my professional network, which will pay dividends for many years to come.

Before, in my role as a contracting officer, my research rarely extended further than the Federal Acquisition Regulation and its supplements. I was trained in the profession to be able to answer the questions "What does the contract say?" and "What do the regulations say?" Although I still maintain that those are two essential questions, our habits should sometimes lead us beyond reviewing contracts and regulations. To better assess the cost, schedule or performance risk of deviating from typical procurement methods, it is important to also look to the originating statutes, and any Government Accountability Office or Court of Federal Claims decisions, too.

As I progressed through the MSL program, completing countless essay prompts throughout, I became able to more quickly and accurately spot concerns and identify questions I needed answered before taking a stance on an issue or making a recommendation. These essay prompts conditioned me to think through very fact-specific if-then situations and present options. Some examples included: Could my mock program manager use a certain color of money to refurbish his office? Or is a particular expenditure for my mock federal grant recipient allowable for reimbursement?

Program managers often seek contracting professionals' opinions—albeit *credible* opinions, not off-the-cuff guesses—about whether a particular course of action is permissible during the acquisition planning phase. Credible opinions incorporate legal precedents or trace to supporting information—statutes, regulations or policies—rather than pointing to a "because I said so" rationale.

In addition to providing opinions, contracting professionals are also often expected to solve disagreements in favor of a customer or contractor. For example, a typical day in the life of a contracting officer involves a contractor or customer contacting them about a dispute, and spewing off lots of facts, yet seemingly always withholding the ones that are most important or relevant.

Much as in real life, the MSL program's essay prompts emulated these types of scenarios. The professor cluttered the issue with non-relevant information and intentionally omitted details one would need in order to make a well-supported decision. This approach required me—the acquisition professional—to weed out what was relevant from the facts given, and what was not, then determine what questions I needed answered before I could opine on an issue.

Additionally, to further illustrate the similarities between the program and real life, for each essay prompt, most professors randomly assigned students to different roles. These were often attorney roles representing either the government or contractor client, but sometimes assignments included being in a contracting-officer, program-manager or contractor role. Students had to persuasively and sufficiently negotiate a position in favor of their client's interests. Some scenarios seemed impossible to successfully argue, given the facts, making them highly representative of everyday procurement-related situations involving, for example, schedule delays or ambiguous requirements or terms and conditions.

As there was no option to challenge an assigned role, you had no choice but to give it your best, most persuasive effort to prove why your client is right and theirs is wrong. In theory, that's what

ACADEMIC APPLICATIONS

An M2A3 Bradley Fighting Vehicle on the range during gunnery training at the Doña Ana Range Complex, New Mexico, Aug. 3, 2018. The author will apply her studies to significantly expand the contracting advisory support she provides to her current team, the NGCV CFT. (Photo courtesy of NGCV CFT)

attorneys do. Given that this was law school, it wasn't surprising that sometimes you'd also get a client with a weak case who nevertheless expects you to win.

Although the government never serves as the contractor's adviser under normal circumstances, contemplating (and arguing) a scenario from the opposing (contractor) side was enlightening. Before the program, I had narrowly looked at issues solely from the government's lens. These exercises broadened my perspective and forced me to think from multiple sides.

THE ART—AND SKILL—OF PERSUASION

In addition to expanding my critical thinking skills, the MSL program also improved my writing. People in the contracting career field write a lot. From acquisition and contracting documents to assessing and documenting contractors' performance, there is not a day that goes by that we are not writing *some* document that is subject to the review and critique of others.

Responding to the professors' essay prompts—which mirrored disputes that the government and contractor would likely face during the formation or performance phases of a federal contract—made me a more succinct and persuasive writer. Students in this program cannot escape without writing tens of thousands of words spread over hundreds of pages. I learned to be concise because many essay responses required strict criteria, not to exceed 500 words, for example. There was also a firm requirement to support your position or recommendation with case law, regulation or policy to persuade your audience. These types of criteria are representative of best-practice writing within a contracting office. A contracting officer frequently communicates with senior leaders who don't have time to read through

pages of detailed information, and they are typically most interested in, "Where, in the statute or regulation, does it say that I can't?"

LASTING BENEFIT

Probably the most valuable benefit of the program is growing my professional network and friendships. Along with the seven other Army civilians who were part of the first cohort, I had the privilege not only to meet, but also to learn from world-renowned full-time and adjunct faculty who are skilled in the federal acquisition system. I also got to study alongside other domestic and international students, who currently practice law for the different branches of the U.S. armed forces or major defense contractors. Being a part of a unique and diversified network of professionals is priceless. Having met so many people serving in various roles within the federal acquisition team has increased the chance that I'll have a contact whom I can call upon when I need advice or perspective on virtually any issue.

I WISH I'D KNOWN

For those who have an inkling of interest in the MSL program, there are some things that I would have appreciated knowing at the outset.

First, be aware of the law school curve. Google it. Basically, it compares your performance to other students in the class and limits the percentage of students that may receive grades in each letter grade category (i.e., A (comprised of A+ and A); B (comprised of A-, B+ and B), etc.). For example, at GW Law School, professors may award no more than 10 students (30 percent) either an A+ or A in a class with fewer than 34 students. Additionally, no more than 22 students (65 percent) may receive either an A-, B+ or B (unless the professor determined that there were fewer than 10 students who earned an A; thus, any "unused" A grades may be used in the B category). It can work in your favor, but it can also work against you, as it did me on two occasions.

> Some scenarios seemed impossible to successfully argue, given the facts.

Second, unbeknownst to me at the time, not all the courses in the degree program were available online. I was most excited about taking two classes: Government Procurement of Intellectual Property and Bid Protests. However, COVID-19 delayed the school's progress in getting them online within the timeframe I needed. Future students shouldn't experience the same disappointment, though, as both classes will have an online option as of August—in time for the start of the 2023 academic year. That being said, it doesn't hurt to be diligent in inquiring whether courses are available to you if you live outside the Washington commuting area.

Third, all students must take an introductory contracting class during their first semester. Although the grading rubric was simply pass-fail, the foundational information taught through the prerecorded

LEGAL EASE

The U.S. Army is willing to pay law school tuition with the help of the Funded Legal Education Program. (Image by Getty Images)

lessons made me question whether applying for this program was the right decision for me. I remember thinking, "Here I am in law school, having had an unlimited contracting warrant at one time in my career, and I am learning the basic differences between a supply and service contract."

I feared the entire program would rival my experience obtaining my advanced certification in the contracting career field at Defense Acquisition University (DAU). I don't mean that to be a slight against DAU—the MSL program was a completely different experience from the practical training approach DAU takes. Two significant differences between the MSL program and DAU's certification program is that you are learning with and from other students who want to be there, as opposed to students who are there because they have to be per the Defense Acquisition Workforce Improvement Act. You are also getting the perspectives and opinions from contractor representatives, whereas DAU's courses are generally restricted to only DOD employees assigned to acquisition-coded positions.

Lastly, although I had a love-hate relationship with the writing requirements, I was oblivious to how much writing I'd have to do. While you don't have to *love* writing, you certainly have to *like* it, or you may struggle to motivate yourself to complete the assignments or do well in the program.

Beyond being surrounded by brilliant students and faculty, GW Law teaches you the "why"—*What were lawmakers aiming to achieve or prevent when they enacted relevant acquisition-related laws?*—which is intended to help students evolve into leaders who will later develop policies impacting their agencies and even the federal government. The MSL program does a great job challenging you to look at legal issues from all perspectives (not just through a government lens) and has contractor representatives enrolled in the program who can share their practical examples. Thus, the MSL program has a distinct advantage in developing a more well-rounded contracting professional.

WHAT'S NEXT?

Now that I've graduated, the question I have gotten the most is, "Now what?" In the future, I plan to become more involved in federal acquisition policies—creating, dissolving and reforming. However, for now, I intend to use my studies to significantly expand the contracting advisory support I provide to my current team, the NGCV CFT. Given that the team is responsible for the Army's second overall modernization priority—leading the way in changing how new capabilities are developed and procured—this degree has put me in a credible position to question long-established local practices with an increased knowledge and understanding.

Ultimately, the skills I acquired from the MSL program have allowed me to advise more dynamically than I could previously, so that I can better assist other acquisition workforce members to maintain and improve the Army's ability to win in a complex world.

I would love to see ODASA(P) expand this program to incorporate a developmental rotation to additional relevant acquisition positions that may be more difficult to enter as a candidate outside that office. One example might be a policy area within the Department of the Army.

CONCLUSION

For those acquisition professionals who may be contemplating the program—in case it was not obvious—I highly encourage you to leap. This program will not only advance your ability to examine government procurement rules and procedures in context with policy analysis, but it will also strengthen your critical thinking skills, improve your writing and enlarge and diversify your professional network.

If you are on the fence about it or want to ask specific questions, please do not hesitate to contact me directly at **corey.l.richards5.civ@army.mil**.

For more information about the program, go to ***https://www.law.gwu.edu/msl****.*

COREY L. RICHARDS works as an acquisition analyst and contracting adviser to the Next-Generation Combat Vehicles Cross-Functional Team. She provides guidance on regulatory compliance and competition strategies to ensure stakeholder decisions synchronize with Army modernization priorities and objectives. She holds an MBA from Walsh College and a B.S. in general management from Oakland University. Additionally, she recently earned her Master of Studies in Law from The George Washington University Law School. She is a certified contracting professional and holds the DAWIA Advanced certification in program management.

A NEW PATH

Though Swinford's previous experience was in PEO Aviation and PEO Missiles and Space, he had to quickly learn about ground combat systems in order to represent the Army's interests during key briefings and engagements. (Photo by Getty Images)

BECOMING THE MIDDLEMAN

An Army civilian delivers capabilities to Soldiers while LEAD-ing with experience.

by Cody Swinford

I arrived at the Pentagon at the end of February 2022 just as many of the COVID-19 restrictions were being lifted, but the foot traffic was still sparse as most people were still at maximum telework. I was there as a part of the 24-month Leadership Excellence and Acquisition Development (LEAD) program to start my temporary assignment as a Department of the Army Systems Coordinator (DASC). As I was getting acclimated to the building and browsing the Fort America store on the second floor, I noticed a T-shirt that caused me to both think and chuckle. It said, "I Made It Inside the Pentagon."

Security is a priority and is maintained to the greatest extent possible whether you are coming as a visitor on business or, like me, as part of your job. The bustling activity at the main entrance is hectic but runs like a well-oiled machine. Once inside, going up the escalators, you land on what looks like a shopping mall area with everything from banking to vision care, a flower shop, a CVS pharmacy and, of course, the smell of coffee and food from the many vendors nearby.

To those outside of DOD, the five-sided building is a symbol of our nation's military strength and is where each of the military services' leadership is located, and where decisions about national defense are made. When I told family and friends from my small, Southern, middle-Tennessee town that I would be working at the Pentagon, they were in awe and wonder about what I would be doing. The adage that "If I told you, I'd have to kill you," came to mind. My family made me feel more important than I know I really am. In my now 25-year career with the Army, my job has always been to deliver capabilities to the men and women wearing the uniform. This is exactly what I would continue to do as a DASC.

WHAT IS A DASC?

A DASC works in the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (OASA(ALT)) for the Army acquisition executive (AAE). We are the liaisons among OASA(ALT) staff and the numerous program executive offices (PEOs) located around the country, supporting the program management offices that design, develop, procure, deliver and sustain everything a Soldier wears, drives, flies, fires and uses to make them successful. DASCs are primarily Army civilians, majors and lieutenant colonels.

I got to the Pentagon and the OASA(ALT) as a result of the LEAD program, which is open to midcareer professionals like me. I applied and was accepted, and the program began in May 2021.

LEAD uses my current skills in business, but also prepares me for positions of greater responsibility within the Army acquisition community and, in particular, program management. The

goal of the two-year program—while not a guarantee—is to be promoted and potentially selected to serve as a program manager at either the lieutenant colonel or colonel level. The six-month assignment at the Pentagon is just one of three phases bookended between two longer nine-month positions at my primary duty location, which is Redstone Arsenal in Huntsville, Alabama.

As a DASC, I worked with the Mobile Protective Firepower, Stryker brigade combat team and Vehicle Protection Suite portfolios within the Soldier and Maneuver Directorate, which supports the PEO for Ground Combat Systems in Warren, Michigan. I served as the eyes and ears of these programs in the building and could be either proactive or reactive, depending on the circumstances. Most DASCs manage multiple programs, depending on the size and scope and where the program is in the acquisition life cycle. By being located in the Pentagon, DASCs can attend meetings on behalf of the programs and respond quickly to tasks related to our programs, and then relay any messages to our offices.

ARMY PROGRAM BUDGET BRIEFS

A system coordinator's job is to maintain the Army's position for our programs and work all related aspects of cost, schedule and performance between our program and product managers and Army staff offices that support plans, programs and resources at the Army headquarters level. While we support or represent the different PEOs, program and product managers, we work for the OASA(ALT)—it is our job to represent the intentions of the headquarters. Shortly after I started, I was told I would need to start preparing for key briefings and engagements. The annual budget cycle begins after the president's State of the Union address is delivered and his budget is released to Congress. I would quickly need to become an "expert" for the programs I would be supporting.

Though my background was working for the PEO for Aviation and the PEO for Missiles and Space, now I would need to learn about ground combat systems. So, over the next month, I drafted, reviewed and updated the current and near-term status of the Stryker brigade combat team and the Vehicle Protection Suite while

A TEAM EFFORT

Swinford, front row, second from right, enjoyed his time as a DASC with Soldier and Maneuver Directorate colleagues, from rear left, Judy Gachupin, Jonathan Brown, Maj. Ryan Ressler, Capt. Tony White, Carlton White and David Nelson. (Photo courtesy of the author)

working intimately with the program manager and support staff to learn as much about the program as I possibly could so I could relay a clear, concise and consistent message to Congress.

We develop what are called Army program budget briefs—presentations to the Senate and House appropriations committees—to outline the Army's position regarding the upcoming fiscal year requirements. It is our opportunity to explain how and what each program or product management office did with the money Congress appropriated to our programs last year. That might include how many systems we procured or key test events that took place.

We also defend and justify what program management offices can and cannot do with the funding originally planned for in the program objective memorandum, based on potential increases or decreases to the overall defense budget. After the briefings, we respond to requests for information related to our programs throughout the end of the budget cycle, when both the Senate and House pass the defense appropriation for the next fiscal year.

OTHER DUTIES

Aside from those briefs, the DASC builds relationships with the program managers and helps them resolve complex problems with their programs by navigating assistance from Army senior leaders and staff functional offices. For instance, the secretary of the Army was asked during congressional testimony about active protection systems. Since it pertained to one of my programs, the Vehicle Protection Suite, it was my job to work with the program manager to draft an information paper related to this topic so that the secretary was aware of the current state and could provide a formal response to Congress on this topic if necessary.

We also play an integral part when a program has a milestone-decision review, by assisting the program office with coordinating meetings with key players and decision-makers. The DASCs also host the milestone-decision review meeting, take notes and respond to any after-action reports or follow-up questions. Midway through my DASC assignment, I was asked to do just that and assist the Mobile Protected Firepower program to attain final approval for its milestone C so it could award a low-rate initial production contract. It was an exciting time for both the program and the Army as it was the first acquisition program to successfully transition from a middle-tier acquisition pathway to a major-capability acquisition pathway. And while most of the legwork had been accomplished before my involvement, assisting with those final briefings helped me gain a better appreciation and understanding of the life-cycle process we are involved in daily.

CONCLUSION

My six-month tour at the Pentagon and the experience I received in OASA(ALT) as a DASC were invaluable and helped to broaden and deepen my skills as an acquisition professional. I learned how to maneuver the ins and outs of the acquisition process, from down at the program and product manager and PEO levels up through the upper chain of command at Army headquarters.

The LEAD program has allowed me to explore the opportunities in Army acquisition that are outside of my career path. For someone looking for a change, it is a great program to consider. My DASC assignment has helped me build a background of knowledge and information, as well as a network of contacts to make me successful in any Army acquisition program or product team I join in the future. It will certainly make me a more effective leader because of my understanding of the larger Army mission as it relates to acquisition and getting capabilities into Soldiers' hands.

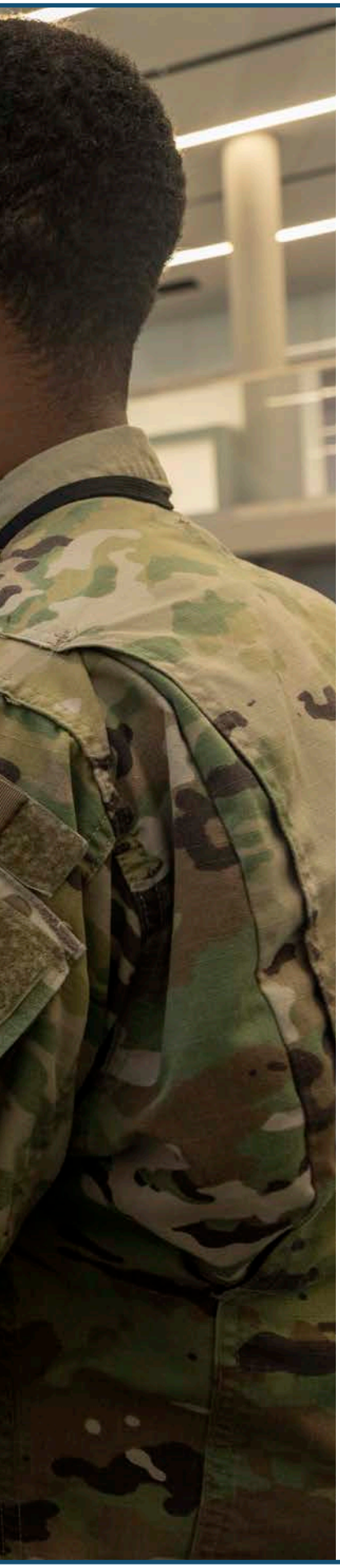
LEAD
LEADERSHIP EXCELLENCE AND ACQUISITION DEVELOPMENT

(Image by USAASC)

For more information about the LEAD program, go to ***https://asc.army.mil/web/career-development/programs/lead/****.*

CODY SWINFORD has worked for the Army for 25 years, including four years on active duty as an enlisted Soldier, and supported multiple PEOs and program and product management offices, including PEO Aviation, PEO Ground Combat Systems and PEO Missiles and Space. He is currently participating in the LEAD program. In September, he transitioned to Phase III, and is assigned to the Rapid Capabilities and Critical Technologies Office at Redstone Arsenal in Huntsville, Alabama. He has an M.S. in management, acquisition and contracts from the Florida Institute of Technology and a B.S. in secondary education from Athens State University. He holds the DAWIA Advanced certifications in business, cost estimating and business, financial management, and the Practitioner certification in program management.

FACTORY FUNCTIONS
Capt. Keyshawn Lee of the Army Software Factory conducts activities from his workstation. (Photo by Austin Thomas, Army Futures Command)



FOR SOLDIERS *BY* SOLDIERS

The Army Software Factory is hastening the Army's ability to develop tech talent from within.

by Col. Vito Errico and Col. Jason Zuniga

The Army Software Factory is a first-of-its-kind initiative to develop transformational tech talent from within the Army's existing ranks.

Situated on a community college campus in downtown Austin, Texas, the Army Software Factory draws in Soldiers and DA civilians who are eager to learn in-demand software development skills and apply them to persistent Army challenges.

The approach is innovative because it recognizes that many of the capabilities the Army will require in future battlefield settings, such as the ability to solve problems and troubleshoot new technologies without needing to call on external support, can be cultivated internally.

"The Army Software Factory is important not only because it confers modern software knowledge, but also because it exposes members of our force to increasingly creative and productive ways of thinking and problem-solving," explained Matthew Flautt, chief technology officer at the Army Software Factory.

The command is responsible for producing the concepts, organizational designs and technological requirements that will enable the Army, as part of the joint force, to achieve overmatch in multidomain warfare. So it's a natural fit for the Army Software Factory because the talent development model it is piloting has implications for future force design.

"We will always partner with industry to deliver cutting-edge solutions to our Soldiers. However, a rapidly evolving digital age requires us to foster enhanced tech understanding and talent within our own force—both to remain nimble at the tactical edge and to ensure that members of our great Army can optimize their own talents and contributions to the nation without having to transition out of uniform," said Master Sgt. Antraun Glover, the Army Software Factory's lead noncommissioned officer.

KEEPING PACE WITH TECHNOLOGY

Providing additional pathways for learning and professional development to Soldiers and DA civilians can improve retention as well as recruitment, particularly when the education and training being offered is intensive, hands-on and as immersive as a private-sector alternative.

The Army Software Factory opened its doors in January 2021 and has since welcomed four cohorts and more than 100 members. A new cohort consisting of approximately 20 Soldiers and five DA civilians arrives every six months; cohort members, who are selected from a competitive pool of applicants, come from a variety of locations and military occupational specialties, bringing with them diverse backgrounds and insights.

Each person who arrives at the Army Software Factory is expected to invest considerable energy and effort into the three-year program, which commences with a tech accelerator phase—combining classroom learning on the basics of coding and software development with tech expert mentorship—and advances through industry partner pairing, skills specialization and advanced knowledge application. Throughout the process, the program embraces tech industry best practices, such as imaginative brainstorming and openness to trying new ideas, to accelerate innovative solutions while also encouraging retention of top technical talent.

While the program is still new, the plan is to continue harnessing the talents that Army Software Factory members develop long after they graduate the program, either through placement in tech-specific Army roles or by embedding tech-savvy personnel in Army organizations or units that could benefit from the expertise.

If "data is the ammunition of the future," as defense officials have underscored, then the Army Software Factory provides a promising avenue for developing the technical experts needed to handle and deploy data on the ground, at the speed of relevance and against near-peer competitors who are also investing heavily in state-of-the-art warfighting technologies.

LEVERAGING SOLDIER INSIGHTS

The motto of the Army Software Factory is "By Soldiers. For Soldiers." Brief and to the point, the phrase emphasizes one of the program's greatest strengths: its ability to advance Soldier-centered design of digital tools and applications through the active participation of Soldier problem-solvers.

Many Soldiers arrive at the Army Software Factory having already completed multiple years of service. They include combat veterans, special forces members and West Point graduates. Some are brand new to the field of software development, whereas others have IT backgrounds. Regardless of their length of service or

TEXAS FACILITY TOUR

Young J. Bang, principal deputy to the assistant secretary of the Army for acquisition, logistics and technology, met with leaders and took a tour of the various facilities of Army Futures Command in Austin, Texas, in April. (Photos by Austin Thomas, Army Futures Command)

field of expertise, they each have unique insights that they are eager to apply.

By employing a learning-by-doing process, the Army Software Factory allows cohort members to tackle real-world Army challenges while simultaneously honing their software development skills. Anyone in the Army can submit a problem set for consideration through a portal available on the Army Software Factory website. If selected, a problem set will be assigned to a cohort member project team—supported by embedded software development expert trainers, who have experience working with leading tech companies—that will work on that problem set as a software application.

As cohort members progress in the program, they have the opportunity to focus on Agile and Lean Six Sigma management, user-centered design and various application and platform engineering disciplines. The Army Software Factory additionally keeps its members apprised of emerging trends in software, cybersecurity and cloud technologies through regular professional development sessions delivered by thought-provoking tech leaders and subject matter experts.

These activities are pivotal because they show cohort members and potential cohort members that, rather than needing to leave the Army to become software developers, they can grow professionally in a competitive field while staying in uniform (or while maintaining DA civilian status, as the case may be).

The Army Software Factory also holds promise for alleviating Army reliance on outside software development and troubleshooting support. Increased self-sufficiency will likely prove essential in future operational environments, where communications may be disconnected or dispersed across multiple domains. In such settings, having Soldiers capable of applying software development skills to remedy software problems that may arise will provide an important warfighting advantage.

NO PAYNE NO GAIN
Chief Warrant Officer 2 Rob Payne at the Army Software Factory. Before joining the Software Factory, Payne made a basic application for operators in his motor pool to digitize the maintenance process, which proved useful for his Soldiers, and underscored the benefits of having Soldiers participate directly in the digital tool development processes. (Photo by Army Futures Command)

ARMY INGENUITY

The strength and beauty of the system also lies in its ability to harness domain expertise present in participating Soldiers and DA civilians, many of whom already have years of Army service. An example of this is the story of Chief Warrant Officer 2 Rob Payne.

Payne enlisted as a Bradley Fighting Vehicle mechanic in 2008 and became a warrant officer to have a more direct role in improving processes and influencing maintenance operations.

He did just that by making the preventative maintenance checks and services process—a system of ensuring mission readiness by tracking and performing preventive maintenance on trucks and other rolling stock equipment—easier for Soldiers.

As Payne became more familiar with the Global Combat Support System – Army, he realized that maintainers were taking digital system output but using a pen-and-paper process to get updated preventative maintenance information back into the

system. To improve this time-consuming and error-prone process, Payne taught himself elementary programming skills and made a basic application for operators in his motor pool to digitize the maintenance process. His application proved useful for his Soldiers and also highlighted the benefits of having Soldiers—particularly those with hands-on experience working with a given system—participate directly in digital tool development processes.

When Payne joined the inaugural cohort of the Army Software Factory, he had the opportunity to apply his experience as part of a Software Factory application problem.

"Oftentimes, the people who make software don't have experience in the domain, which can result in software that doesn't work or doesn't meet the needs of the end user," Payne shared in a conversation with Army Futures Command staff. He explained that his expertise in maintenance contributed to his team's ability to produce an effective app.

After problem submission from Army Materiel Command, Army Software Factory produced a preventive maintenance application that can provide Soldiers with the resources they need, such as technical manuals and maintenance records, to perform preventive maintenance on equipment. The free app (available at https://pmcs.swf.army.mil/) is accessible from any Army employee's personal device and could improve unit readiness and enhance Soldier experiences across all components of the Army.

The process illustrates how, for Soldiers like Payne, the Army Software Factory offers a new opportunity for growth within the Army. At the same time, for the Army, Soldiers like Payne represent the possibilities of the future, and how empowering Soldiers and DA civilians to solve problems using new technology can make for a stronger overall Army.

The Army Software Factory's focus on user-friendly apps signals new ways of thinking about and overcoming problems, as well as future new ways the Army can implement solutions at scale. The Army Software Factory is helping ensure innovation is shared across the Army, instead of taking place in silos.

CONCLUSION

The Army Software Factory is imagining and executing what a future force design and associated talent development could look like, specifically in the realm of software development and operations. This is noteworthy not only because the Army is exploring how to grow critical future skills from within, but also because it is exposing Soldiers and DA civilians to new, digital ways of thinking and problem-solving.

The Army's strategic investments in initiatives like the Army Software Factory illustrate how leap-ahead modernization requires more than identifying and incorporating external solutions to Army challenges. To modernize extensively and sustainably, we must nurture modern talent that can advance systems internally. The beauty of this approach is that it focuses on maximizing the potential of our most valuable and most readily available resource—people—to further Army modernization aims. This creates a force structure that is fortified by a collective vision as well as individual empowerment.

The Army Software Factory recognizes that in an Army that wants warriors, ensuring that warriors feel wanted is paramount. Investing in new skills, encouraging critical thinking and empowering Soldiers to tackle Soldier-specific problems will help to build a future force that is as fulfilled as it is formidable.

The Army Software Factory aligns with a fiscal year 2022 congressional mandate that DOD develop software competence in those who have the aptitude but lack formal education.

In addition to building a capability to design and produce software applications for Soldiers, the Army Software Factory serves as a champion for operationalizing cloud technology, Agile methodologies and development, security and operations (DevSecOps) simultaneously within the Army, as many Fortune 500 companies have done to enable digital transformation.

To learn more about the work of the Army Software Factory, to submit a problem set or to apply for an upcoming cohort, go to ***https://armyfuturescommand.com/software-factory/****.*

COL. VITO ERRICO is the director of the Army Software Factory. He holds an MBA from Yale University, a Master of Policy Management from Georgetown University and a B.S. from the United States Military Academy at West Point.

COL. JASON ZUNIGA is the chief operations officer of the Army Software Factory. He holds an MBA from The Wharton School of the University of Pennsylvania and a B.S. in engineering industrial management from the United States Military Academy at West Point.

Ninth Annual
Major General Harold J. "Harry" Greene
Awards for Acquisition Writing

"I was very lucky. Over the years, I was honored to have jobs where I could work with great people, and we could get great things done. We've accomplished a lot, but there is still a lot of work to do."

-Major General Harold J. Greene

The 2022 Major General Harold J. "Harry" Greene Awards for Acquisition Writing provide a platform for critical thinking and writing about how the Army can best deliver capabilities to Soldiers - both now and in the future. Share your ideas, expertise, experiences, and solutions by submitting your essay in one of the following categories:

- Acquisition Reform
- Future Operations
- Innovation
- Lessons Learned

The competition is open to everyone, and wide participation is encouraged among the Department of Defense acquisition workforce. Submission requirements are available at:
https://www.army.mil/asaalt

U.S.ARMY

ON THE MOVE

JOINT PROGRAM EXECUTIVE OFFICE FOR CHEMICAL, BIOLOGICAL, RADIOLOGICAL AND NUCLEAR DEFENSE

1: NEW JPEO CBRND

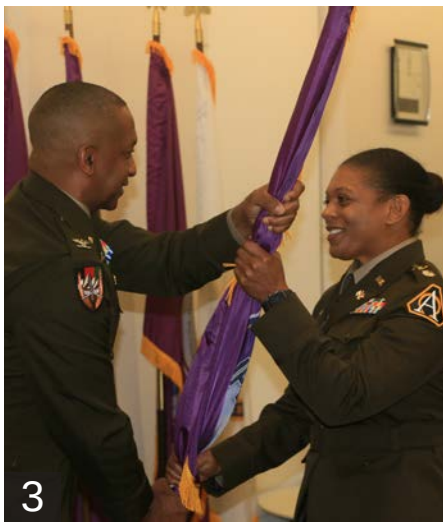
Darryl J. Colvin, left, accepted the charter and assumed responsibility as leader of the Joint Program Executive Office (JPEO) for Chemical, Biological, Radiological and Nuclear Defense (CBRND) from Douglas Bush, the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)), during a ceremony July 15 at Aberdeen Proving Ground, Maryland. Colvin previously served as the deputy program executive officer (PEO) for Missiles and Space at Redstone Arsenal in Huntsville, Alabama, before joining JPEO CBRND as acting PEO in November 2021. Colvin began his Army career as a second lieutenant in 1985 through the Reserve Officers' Training Corps at the University of Missouri, Rolla. Colvin retired as a lieutenant colonel in January 2006 after serving on active duty for 20 years. (Photo courtesy of JPEO CBRND)

2: NEW JPM FOR CBRN MEDICAL

Col. Matthew Clark, right, accepted the charter for the Joint Project Manager for Chemical, Biological, Radiological and Nuclear Medical (CBRN Medical) from Darryl J. Colvin, the PEO for JPEO CBRND, during a change of charter ceremony July 14 at Fort Detrick, Maryland. Clark most recently served as the senior policy adviser and director of COVID-19 international response operations on the White House COVID-19 response team, after serving as the lead program manager for the vaccine team in Operation Warp Speed and the federal response. (Photo courtesy of JPEO CBRND)

3: JPM CBRN SENSORS NEW JOINT PRODUCT MANAGER

Lt. Col. Natashia Coleman, right, accepted the flag for the Joint Product Manager for CBRN Sensors from Col. Robert Carter, the joint project manager for CBRN Sensors, during a change of charter ceremony June 15 at Aberdeen Proving Ground. Coleman served most recently as product lead for Unified Network Capabilities and Integration at the PEO for Command, Control, Communications–Tactical (C3T). (Photo courtesy of JPEO CBRND)



4: DEPUTY SELECTION AND SES PROMOTION

Nicole Kilgore, center, assumed responsibility as the deputy PEO at JPEO CBRND during a ceremony March 22 at Aberdeen Proving Ground. Her husband, Don Kilgore, right, also attended the ceremony. Along with her selection, she was promoted into the Senior Executive Service (SES). Jason Roos, Ph.D., former joint PEO CBRND, departed last November, and currently serves as chief operating officer at the Administration for Strategic Preparedness and Response within the Department of Health and Human Services Coordination and Operations Response Element. Kilgore was previously the acting deputy joint PEO for assisted acquisition and medical COVID-19 response. In this role, she focused primarily on medical and protection portfolios and led coordination of the DOD COVID-19 joint assisted acquisition efforts in support of the Department of Health and Human Services. (Photo courtesy of JPEO CBRND)

5: CHANGE OF CHARTER

Lt. Col. Edwin Kolen, right, accepted the charter for the Joint Product Manager for JPM CBRN Medical from Col. Ryan Eckmeier, left, then-joint project manager for CBRN Medical, during a ceremony June 9 at Fort Detrick. Kolen most recently served as a weapons coordinator for midrange capability in the Rapid Capabilities and Critical Technologies Office at Army Test and Evaluation Command. (Photo courtesy of JPEO CBRND)

PROGRAM EXECUTIVE OFFICE FOR COMBAT SUPPORT AND COMBAT SERVICE SUPPORT

6: PROMOTION AND ASSUMPTION OF CHARTER

Brig. Gen. Samuel L. "Luke" Peterson, right, accepted the charter and assumed leadership of the PEO for Combat Support and Combat Service Support (PEO CS&CSS) from Lt. Gen. Robert L. Marion, principal military deputy to the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)), during a June 30 ceremony at Detroit Arsenal, Michigan. Deputy PEO Andrew "Andy" DiMarco, not pictured, served as the acting PEO before Peterson's assignment.

As PEO, Peterson provides professional and executive management for the development, systems integration, acquisition, testing, fielding, sustainment and modernization of approximately 250 diverse equipment systems across the Army's transportation, quartermaster, ordnance and engineer portfolios. Before this assignment, he served as the deputy director for transition supporting the Rapid Capabilities and Critical Technologies Office since August 2020. Previously, he served as the deputy director supporting the Office of the ASA(ALT) deputy for acquisition and systems management. (Photo by Sam Smoly, U.S. Army Garrison Detroit Arsenal)

PROGRAM EXECUTIVE OFFICE FOR COMMAND, CONTROL AND COMMUNICATIONS – TACTICAL

1: PEO C3T WELCOMES POTTS

Maj. Gen. Anthony Potts assumed leadership of the PEO for Command, Control and Communications – Tactical (C3T) during a June 23 ceremony hosted by Army Acquisition Executive Douglas R. Bush, not pictured, at Aberdeen Proving Ground, Maryland. Potts previously led PEO Soldier. Outgoing leader of PEO C3T, Maj. Gen. Robert Collins, not pictured, assumed a new role as the deputy for acquisition and systems sustainment at the Office of the ASA(ALT). (Photo courtesy of PEO C3T)

2: CHARTER PASSED AT PM FIRE SUPPORT COMMAND AND CONTROL

Lt. Col. Timothy Godwin, left, assumed responsibility as the product manager for Fire Support Command and Control during a June 29 ceremony at Aberdeen Proving Ground. Godwin comes to PEO C3T from the Army's senior services manager within the Office of the Deputy Assistant Secretary of the Army for Procurement, where he served as the services team lead. Outgoing product manager Lt. Col. Jason Carney relinquished responsibility and accepted the award for the Order of St. Barbara from Col. John Whelahan Jr., not pictured, during the ceremony. Carney is now serving as executive officer for the 413th Contracting Brigade at Fort Shafter, Hawaii. (Photos courtesy of PEO C3T)

3: TMC WELCOMES NEW PRODUCT MANAGER

Lt. Col. Travis Rudge, center right, accepted the charter for the Product Manager for Tactical Mission Command during a June 28 ceremony at Aberdeen Proving Ground, from Col. Matthew Paul, center left, Project Manager Mission Command, as Maj. James Gallagher, right, assistant product manager for Mounted Mission Command Joint Battle Command – Platform stood at attention. Rudge was previously a Training With Industry fellow with ManTech International Corp., serving as operations lead for a cybersecurity training and platform services contract under the Defense Information Systems Agency. Outgoing product manager Lt. Col. Shawn Chu-Quinn, left, now moves to a Training With Industry fellowship with Mission Consulting Service LLC. (Photo courtesy of PEO C3T)

4: CHANGE OF CHARTER FOR UNCI

Lt. Col. Mark Scott, right, accepted the charter for the Product Manager for Unified Network Capabilities and Integration (UNCI) during a May 13 ceremony hosted by Col. Shane Taylor, center, project manager for Tactical Network, at Aberdeen Proving Ground. Scott comes to UNCI from the National Reconnaissance Office, where he served as a product manager responsible for satellite ground network and emerging counter-drone technologies. Outgoing product manager Lt. Col. Natashia Coleman, left, now assumes a new role at the JPEO for CBRND. (Photo courtesy of PEO C3T)

5: NEW PRODUCT LEAD COMMON HARDWARE SYSTEMS

Raymond Hartley, right, accepted the charter for the Product Lead for Common Hardware Systems during a July 15 ceremony at Aberdeen Proving Ground. Matthew Maier, left, project manager for Interoperability, Integration and Services, and Jamie Plakosh, center, Common Hardware Systems, were also in attendance. Hartley comes to PEO C3T from Project Manager Positioning, Navigation and Timing, where he served as assistant product manager responsible for the cost, schedule and performance of the Mounted Assured Positioning, Navigation and Timing System Generation II prototyping effort. (Photo courtesy of PEO C3T)

6: PRODUCT MANAGER TACTICAL CYBER AND NETWORK OPS

Lt. Col. Keith Jordan assumed responsibility as the Product Manager for Tactical Cyber and Network Operations during a June 24 ceremony at Aberdeen Proving Ground. Jordan returned to PEO C3T, where he served as the assistant product manager for Tactical Network from 2016 to 2018 and, most recently, as the U.S. Army Combat Capabilities Development Command (DEVCOM) C5ISR Center Research, Technology and Integration Directorate's military deputy at Fort Belvoir, Virginia. Outgoing product manager Lt. Col. Sung In, top, at left, accepted the Meritorious Service Medal from Matthew Maier, right, project manager for Interoperability, Integration and Services. In is transitioning to an assignment with the United States Space Force. (Photos courtesy of PEO C3T)

7: CHANGE IN PRODUCT MANAGER SATCOM

Lt. Col. Carson Tenney was welcomed as the new leader of the Product Manager for Satellite Communications (SATCOM) during a June 1 ceremony hosted by Col. Shane Taylor, not pictured, the project manager for Tactical Network, at Aberdeen Proving Ground. Tenney most recently deployed as the executive officer to the deputy commanding general for the Combined Security Transition Command in Afghanistan. The outgoing product manager, Lt. Col. NaTasha Wayne, not pictured, was awarded the Meritorious Service Medal during the ceremony. (Photo courtesy of PEO C3T)

8: TACTICAL RADIOS WELCOMES NEW PM

Col. Shermoan Daiyaan accepted the charter for the Project Manager for Tactical Radios during a June 9 ceremony at Aberdeen Proving Ground. He previously led the PEO C3T Product Manager for Tactical Mission Command, followed by an assignment as the chief for Acquisition Management Branch for the Human Resources Command at Fort Knox, Kentucky. (Photo courtesy of PEO C3T)

1: CHARTER PASSED AT PM WAVEFORMS

Lt. Col. Brandon Motte, center right, assumed responsibility for the Product Manager for Waveforms during a June 30 ceremony at Aberdeen Proving Ground. Col. Shermoan Daiyaan, project manager for Tactical Radios, passed the flag. Michael Mercurio, right, deputy product manager for Product Manager Waveforms, also attended. Motte most recently served as the chief evaluator for ground warfare systems in the Capabilities and Acquisition Division, J-8 at the Joint Staff U.S. Army element. Lt. Col. Sherida Whindleton, the outgoing product manager, now serves as the deputy director for the ASA(ALT) Applied Small Business Innovation Research and Small Business Technology Transfer programs within Deputy Assistant Secretary of the Army for Research and Technology. (Photo courtesy of PEO C3T)

2: RETIREMENT AFTER 28 YEARS OF SERVICE

Col. Garth Winterle retired from the Army following 28 years of service in a ceremony hosted by Maj. Gen. (Ret.) Brian Cummings, left, on June 9 at Aberdeen Proving Ground. During the ceremony, Winterle also relinquished the charter for the Project Manager for Tactical Radios. As project manager, he worked to provide modern tactical radios and the Integrated Tactical Network to Soldiers around the globe. In addition to his certificate of retirement, Winterle accepted a citation from the governor of Maryland, the Legion of Merit medal, the Brevet Colonel Award for Signal and a presidential citation. (Photo courtesy of PEO C3T)

3: HMS CHARTER PASSED

Lt. Col. Rustin Jessup, right, assumed leadership of the Product Manager for Handheld, Manpack and Small Form Fit (HMS) during a May 19 ceremony at Aberdeen Proving Ground. Jessup most recently served as a Training With Industry fellow at Motorola Solutions Inc. The outgoing product manager, Lt. Col. Raymond Yu, left, now serves on the senior acquisition officer Special Access Programs and Sensitive Activities Compliance Team for the U.S. Army Office of the Attorney General. Col. Garth Winterle, center, the former project manager for Tactical Radios, also participated in the ceremony. (Photo courtesy of PEO C3T)

PROGRAM EXECUTIVE OFFICE FOR ENTERPRISE INFORMATION SYSTEMS

4: CHANGE OF CHARTER AT DIBS

Ross Guckert, right, leader of the PEO for Enterprise Information Systems (EIS), presented Kevin Curry with the charter for the Defense Integrated Business Systems project management office at a ceremony on June 14. Curry assumed the role of DIBS project manager, replacing Col. Donald Burton, not pictured. (Photo by Laura Edwards, PEO EIS)

5: NEW PEO EIS CHIEF OF STAFF

John Howell assumed the position of chief of staff at PEO EIS in July. In this capacity, he is responsible for overseeing many of the organization's day-to-day operations and initiatives. Previously, Howell served as assistant PEO for Networks, Cyber and Services at EIS, where he oversaw the organization's enterprise information environment mission area. Specifically, he was responsible for overseeing three project offices focused on network modernization, defensive cyber operations and enterprise services, as well as for helping spearhead EIS's integrated enterprise network activities in support of the Army's Unified Network.

6: NEW ASSISTANT PEO, BUSINESS MISSION AREA

Lee James III assumed the role of assistant PEO for the Business Mission Area at PEO EIS in May. In this role, he is responsible for overseeing three project management offices encompassing the Army's data, finance and accounting, human capital and logistics programs. Previously, James served as the project director for Enterprise Services at PEO EIS, where he led the project office responsible for acquiring, fielding and performing lifecycle sustainment of enterprise-level services that support many of the Army chief information officer's largest enterprise initiatives.

7: ASSUMPTION OF CHARTER AT ADP

Col. Robert Wolfe, right, project manager for Army Data and Analytics Platforms (ARDAP) at PEO EIS, welcomed Lt. Col. Laura-Jane "LJ" Freeland, left, as product manager for ARDAP's new Army Data Platform (ADP) product office at a ceremony held May 19. The PEO EIS Army Vantage and Army Enterprise Systems Integration Program Hub components have been rolled up into the ADP product office, which supports Army and EIS data missions. (Photo by Laura Edwards, PEO EIS)

8: CHANGE OF CHARTER AT GFIM

Col. Robert Wolfe, left, project manager for ARDAP at PEO EIS, presented the charter for the Global Force Information Management (GFIM) product office to Richard Eva at a ceremony on July 12. Eva assumed the role of product lead for GFIM, replacing outgoing product lead Jason "JT" Craft, not pictured. (Photo by Laura Edwards, PEO EIS)

PROGRAM EXECUTIVE OFFICE FOR MISSILES AND SPACE

9: PROMOTION TO BRIG. GEN.

Brig. Gen. Francisco J. Lozano, special assistant to U.S. Army Aviation and Missile Command, was promoted from the rank of colonel on July 12 at Redstone Arsenal, Alabama. Lt. Gen. Robert L. Marion, principal military deputy to the ASA(ALT), presided over the event. Lozano, a Texas native and a 1993 graduate of Texas A&M University, previously served as the chief of staff for ASA(ALT) in Washington.

10: PROMOTION AT INTEGRATED FIRES RAPID CAPABILITIES OFFICE

Col. Jeet "Jay" H. Kaji, right, was promoted from the rank of lieutenant colonel on June 30 at Redstone Arsenal. Maj. Gen. Robert A. Rasch, the PEO for Missiles and Space, presided over the event. Kaji serves as the director for counter small unmanned aircraft systems, emergency management cell for the Integrated Fires Rapid Capabilities Office. (Photo courtesy of PEO Missiles and Space)

SHORT-RANGE AIR DEFENSE

Lt. Col. Ryan Sunderman, left, accepted the charter as product manager for Maneuver Short Range Air Defense (M-SHORAD) Product Office at PEO Missiles and Space. Col. Andrew Lunoff, center, project manager for Short and Intermediate Effectors for Layered Defense, presided over the July 15 ceremony. Lt. Col. Beau Barker is the former product manager. Sunderman has the responsibility of providing M-SHORAD capabilities to protect maneuvering forces by defeating, destroying or neutralizing threat rotary-wing, fixed-wing, unmanned aircraft systems, rockets, artillery and mortar capabilities. (Photo courtesy of PEO Missiles and Space)

U.S. ARMY MATERIEL COMMAND

1: AMC SENIOR RANKING CIVILIAN RETIRES

Lisha Adams, executive deputy to the commanding general, celebrated her retirement after 39 years of service during a May 31 ceremony at Redstone Arsenal, Alabama. She closed out her career as a Tier 3 member of the Senior Executive Service. Adams holds an MBA from the Florida Institute of Technology and a B.A. in economics from Birmingham-Southern College. She began her career as a materiel maintenance management intern at Army Materiel Command. In 2011, Adams was selected for the Senior Executive Service. (Photo by Eben Boothby, U.S. Army)

2: AMC WELCOMES NEW OPERATIONS EXPERT

Army Materiel Command (AMC) welcomes Myles Miyamasu, who will serve as the new deputy G-3 for AMC headquarters. Miyamasu replaces Nathan Godwin, who served since 2017 as the deputy G-3 before retiring in September 2021. Miyamasu comes to AMC from the Pentagon, where he worked as the deputy director for force management in the Army Operations Office. (Photo by Eben Boothby, U.S. Army)

U.S. ARMY SECURITY ASSISTANCE COMMAND

3: CHANGE OF COMMAND FOR USASAC

Col. Jason Brad Nicholson, left, assumed command of the U.S. Army Security Assistance Command (USASAC) during a May 24 ceremony hosted by the commanding general of U.S. Army Materiel Command, Gen. Ed Daly, not pictured, at the USASAC headquarters on Redstone Arsenal in Huntsville, Alabama. Originally from Fayetteville, North Carolina, Nicholson was commissioned in 1998 as a field artillery officer through the Army Reserve Officers' Training Corps at North Carolina State University. A doctoral candidate in political science at the University of Utah, Nicholson is an Army foreign area officer who speaks French and German. Daly noted that in his previous assignment as deputy G-5 for U.S. Army Europe and Africa, Nicholson and his team were deeply involved in confronting what many believe is the biggest test of European security since World War II.

Outgoing USASAC commander, Brig. Gen. Garrick Harmon, right, a foreign area officer with extensive experience in Russia and throughout the former Soviet Union and Europe, remains on active duty and will be on special assignments for the Army.

THE CHIEF OF STAFF OF THE ARMY ANNOUNCES THE FOLLOWING OFFICER ASSIGNMENTS:

Brig. Gen. Christopher D. Schneider, PEO for Soldier, Fort Belvoir, Virginia. He most recently served as deputy for acquisition and systems management, Office of the ASA(ALT), Washington.

Maj. Gen. Robert A. Rasch Jr. for appointment to the rank of lieutenant general and assignment as director of Hypersonics, Directed Energy, Space and Rapid Acquisition, Office of the ASA(ALT) at Redstone Arsenal, Alabama. He is currently serving as PEO for Missiles and Space, Redstone Arsenal.

THE CHIEF OF STAFF OF THE ARMY ANNOUNCES THE FOLLOWING PROMOTIONS:

Brig. Gen. Robert L. Barrie Jr. for promotion to the rank of major general. He currently leads the PEO for Aviation, Redstone Arsenal, Alabama.

Brig. Gen. Glenn A. Dean III for promotion to the rank of major general. He currently leads the PEO for Ground Combat Systems, Warren, Michigan.

Brig. Gen. Patrick L. Gaydon for promotion to the rank of major general. He currently serves as deputy chief of staff for operations, plans and experiments, G-3/5/7, United States Army Futures Command, Austin, Texas.

Brig. Gen. Jeth B. Rey for promotion to the rank of major general. He currently serves as director, Network Cross-Functional Team, Aberdeen Proving Ground, Maryland.

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