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OCTOBER-DECEMBER 2017

MORE THAN A CONCEPT

What readiness means for the acquisition community

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Inside the life-and-death battle against the historic Ebola outbreak

THINK READY, BE READY

Equipping challenges must be met before a conflict

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Read "Financial Improvement and Audit Readiness (FIAR) Plan Status Report," from "**THE IMPORTANCE OF KEEPING TRACK**."

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Check out the U.S. Centers for Disease Control and Prevention webpage for Ebola, in "**A TEST OF MEDICAL READINESS**."

Watch Dr. Bruce Aylward's TED Talk, "Humanity vs. Ebola. How we could win a terrifying war," in "**IDENTIFY. QUANTIFY. ELIMINATE.**"

Watch a high energy laser in action, in "**DECADES TO 'ZAP.'**."

Click on the icon wherever you see it in the issue to see more photos and read additional articles.

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From the Editor-in-Chief

My first tour in Germany with an M110 203 mm howitzer artillery unit taught me a lot about readiness, albeit at a unit level. To ensure that our unit could respond to any event, anytime, we would be hit without notice with an emergency deployment readiness exercise (EDRE). Within two hours of an alert, I and 110 of my closest friends in my firing battery had to be in formation, in our vehicles, off the installation and on our way to a local ammunition site and our initial rally point. The sight of those men, the howitzers and support vehicles rolling out—prepared for whatever may come—is seared in my memory. Readiness for me was being able to marshal troops, training and equipment on time whenever the EDRE was called.

For our nation, readiness is much the same, at a much more strategic level. It is having the troops, training and equipment that can deter conflict or prosecute war at a moment's notice, anywhere in the world. Gen. Mark A. Milley, the 39th chief of staff of the Army, made his priorities pretty clear in his initial message to the Army, writing, "Readiness for ground combat is—and will remain—the U.S. Army's #1 priority. … Readiness is #1, and there is no other #1."

Milley went on to clarify that Soldiers must never be sent into harm's way "untrained, poorly led, undermanned, or with less than the *best equipment we can provide*" [emphasis mine]. For every member of the Army Acquisition Workforce (AAW), those last five words are key to what readiness means and what we must do to support it, because without the acquisition professional, Soldiers can't do their job—fight and win this nation's wars.

Another way to look at readiness from an acquisition point of view comes from Dr. Laura Junor, an economist you'll meet in this issue who has more than 20 years of experience in military readiness. As Junor describes it in "Readiness: More Than a Concept" on Page 10, readiness is the ability of a massive and complex supply chain to deliver a single product: military power. I like how she views it as a matter of supply meeting demand. It's a simple concept yet very complicated at the same time. For our readers, it means one thing: Make sure you do your part to supply needed equipment on time, and make sure it meets or exceeds requirements.

As an important part of that supply chain, it's the job of the AAW to provide the equipment Soldiers need. How we do that is the theme of this issue and the subject of a wide variety of articles.

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It's been a year since the Army created its Rapid Capabilities Office to boost readiness by increasing the supply of capabilities to meet demand. Read about its growth and future in "The Power of Prototypes" on Page 62.

Soldiers can't win wars, however, much less meet any readiness requirements, if they're sick. In "A Test of Medical Readiness" on Page 74, see how years of preparation to defend against biological warfare enabled the U.S. military to help identify and defeat a diabolical enemy—the Ebola virus—during the outbreak in Africa that began in 2014.

Finally, just as it has often been said that U.S. Soldiers are the best-educated and best-equipped in the history of the world, the AAW is arguably the best the world has ever known, despite the bureaucratic hurdles and fiscal uncertainty you face daily. It's getting even better thanks to long-term thinking such as the Human Capital Strategic Plan (HCSP), built by the Army Director for Acquisition Career Management Office. The HCSP just marked its first anniversary and, as the estimable Joan Sable notes in "AAW Human Capital Strategic Plan: Year One" on Page 133, "What good is a plan if there is no action towards its implementation?" Learn about what's been done, what remains to be done, and what it means for you.

Comments, suggestions or a great story idea for the future? Please contact the magazine at **ArmyALT@gmail.com** to send them my way. You never know, your idea might be the key to readiness.

Nelson McCouch III
Editor-in-Chief

THE POWER OF EMERGING TECHNOLOGIES

Soldiers from the Delaware Army National Guard 198th Expeditionary Signal Battalion work on a Warfighter Information Network – Tactical (WIN-T) Satellite Transportable Terminal during a Disaster Incident Response Emergency Communications Terminal demonstration in Little Rock, Arkansas, in May. Knowing how to harness capabilities such as WIN-T, along with commercial off-the-shelf telephone, internet and wireless technologies, is essential in Army acquisition to ensure overmatch for U.S. forces. (U.S. Army photo by Amy Walker, Program Executive Office for Command, Control and Communications – Tactical Public Affairs)

FROM THE ARMY
ACQUISITION EXECUTIVE
MS. STEFFANIE B. EASTER

A STRATEGY *for* SUCCESS

Nine objectives together guide the Army Acquisition Workforce to support Soldiers' success on the battlefield

For 242 years, the Army has been associated with some of the bravest men and women our nation has to offer. And for these men and women to continue doing what is asked of them, they need us to continue being a top-notch acquisition workforce. Our acquisition community is charged with a very important task: ensuring that Soldiers around the globe are always equipped with the best and most advanced tools available in the timeliest manner possible.

This is no small job, and to accomplish it, we must be an intelligent, organized, motivated and highly efficient workforce. To aid in this process, there are nine strategic objectives designed to help guide our thinking on a daily basis. These objectives help to keep us focused on acquisition excellence. Each one serves a purpose toward achieving the goal of providing our Army with critical capabilities both on schedule and within the predetermined budget constraints. With our professionals doing just this, our Army has a great chance to achieve its desired readiness levels.

Staying focused on meeting our strategic objectives helps to keep our organization on track for success by ensuring that we are doing what is in the best interest of the Army at all times.

ANTICIPATING THE ENEMY

Soldiers from 2nd Brigade, 101st Airborne Division (Air Assault) set up AN/PRC-155 (Manpack) radios at Fort Bliss, Texas, in July during Network Integration Evaluation (NIE) 17.2. NIE is an annual exercise that provides a test bed for emerging concepts and capabilities in an operationally realistic and rigorous environment. One of the nine strategic objectives for Army acquisition is to quickly identify, procure and field materiel solutions that will counter emerging threats and capabilities from adversaries. (U.S. Army photo by Spc. Jordan Buck, 55th Combat Camera)

Here they are:

1. **Identify process gaps and efficiencies throughout all phases of acquisition.** This involves looking at how we do business on a daily basis and asking ourselves, "Is this the most efficient and effective way to perform a particular task?" This approach is necessary to give our leadership the ability to make the most informed decisions.

2. **Foster a fiscally responsible environment.** It's not enough for us to simply acquire the most advanced technologies and equipment for our Soldiers. We must do so with a commitment to staying within our fiscal boundaries and keeping costs down as much as possible. With today's financial constraints, this aspect of our industry is increasingly under the microscope.

3. **Maintain and leverage our relationships with both industry and government research and development.** This gives our acquisition community more accurate information in regard to development and acquisition strategies, which is a necessity for properly equipping our Soldiers down the line with the absolute best and most effective equipment.

4. **Maintain a well-trained and agile Army Acquisition Workforce.** This has to do with all members of the acquisition team, not just military members. The development of civilian leadership is key to enhancing supervisory skills and creating a well-rounded professional who is capable of excelling within our industry.

5. **Lead and conduct the Army's activities associated with defense exports and cooperation.** This objective will advance our national security policies and objectives. With our professionals making first contact with Army partners, stronger and lasting alliances are forged to the long-term benefit of our relationships.

6. **Cultivate the knowledge and instincts in our workforce** to identify what emerging technologies we are best-suited to pursue in the interests of the Army. This objective goes back to being armed with the latest intelligence to ensure overmatch

through all acquisition phases. It is critical, as our Soldiers cannot afford to wait on indecisiveness or poor procurement choices on our part.

7. **Increase our organizational agility** in requirements generation and modify the processes of acquisition, sustainment and contracting. Because of the constant and rapid changes experienced in conflicts, we as an acquisition community must do everything in our power to keep pace.

8. **Quickly identify, procure and field materiel solutions** so that we may prepare against emerging threats and capabilities from our adversaries. This is accomplished through rapid prototyping of initiatives so that our Soldiers can engage decisively in contested environments.

9. **Establish a framework for monitoring, detection and risk mitigation** to prevent unauthorized transfers of U.S. technology to those that would take advantage and use it against us.

CONCLUSION

These are the objectives we must meet for the Army to maintain itself and successfully defend our nation against an ever-determined adversary. I have no doubt that our acquisition workforce has the knowledge, skill set and leadership to meet these objectives.

It's critical that we succeed in this endeavor, as the organization responsible for developing, acquiring and fielding capabilities to our Soldiers. By working together and each day striving to complete these objectives, we put our Soldiers in the position to succeed each and every time they are on the battlefield.

RESEARCH AND DEVELOPMENT IN ACTION

Soldiers assigned to Task Force Griffin, 16th Combat Aviation Brigade (CAB), 7th Infantry Division load an AGM-114 HELLFIRE missile on an AH-64E Apache helicopter in Kunduz, Afghanistan, in May. This support for U.S. Forces Afghanistan is possible, in turn, because of long-standing, ongoing relationships between government and the private sector in research and development. Cultivating and maintaining such ties helps Army acquisition ensure that its development and acquisition strategies will produce the best, most up-to-date and effective equipment. (U.S. Army photo by Capt. Brian Harris, 16th CAB)

KEEP IT REAL

Soldiers with the 1/2 Stryker Brigade Combat Team, 7th Infantry Division prepare an M1126 Stryker for a mission on Joint Base Lewis-McChord, Washington, in August during an operational test of the Integrated Head Protection System and Tactical Communication and Protective System Lite hearing protection. Soldiers provided feedback on how the two systems performed during their training, helping program managers ensure that Soldiers worldwide ultimately get the capabilities they need on the battlefield in the timeliest manner possible. (U.S. Army photo by Sgt. Youtoy Martin, 5th Mobile Public Affairs Detachment)

READINESS:

ARE WE THERE YET?
Soldiers assigned to 1st Brigade Combat Team, 4th Infantry Division stage their vehicles at the National Training Center (NTC), Fort Irwin, California, in June during Decisive Action Rotation 17-07.5. The dual challenges of predicting a system's future and uncertain funding sources have made it difficult for the Army and DOD to measure current readiness or plan for it in the future. (U.S. Army photo by Spc. Gabriel J. Segura, NTC Operations Group)

MORE THAN A CONCEPT

The Army chief of staff's No. 1 priority means a lot of different things to different people. For the acquisition community, many agree that supporting readiness calls for a cradle-to-grave understanding of the systems being acquired, not just their procurement.

by Mr. Steve Stark, Ms. Margaret C. Roth and Mr. Michael Bold

Readiness is in the air. It's a watchword of current U.S. military strategy, the subject of constant media attention, congressional deliberation and internal discussion among the armed forces and our allies: Is the U.S. ready to face off and win against North Korea? Russia? China? Iran? How about violent extremist groups? The concept is not just an abstraction: For everyone who works to support the Soldiers who could go into harm's way at any time in our defense against the "four plus one," readiness is a matter of life and death.

That may be difficult to translate into the day-to-day management of Army acquisition, logistics and technology. But for the acquisition professional, Chief of Staff of the Army Gen. Mark A. Milley's No. 1 priority—"there is no other #1," he has emphasized—essentially means at all times ensuring that the Army has the capabilities to successfully execute its role in the event of a challenge to U.S. interests.

Of the four-plus-one challenges, "We have to be able to deal with two of the four named countries simultaneously, or near simultaneously, and one of them we have to defeat and the other we have to deny," Milley told an audience at the U.S. Army Reserve Command Senior Leader Conference in April 2016 at Fort Bragg, North Carolina. "At the same time, you have to maintain your current level of effort against the counterterrorist fight and you have to protect the homeland. That's for the U.S. military, not just the Army."

Talk to any randomly chosen person involved in the military, and readiness could mean having enough people … the right equipment … appropriate training … enough modeling and simulation … proper testing … adequate maintenance … reliable sustainment … or, a universal theme, enough money. Achieving any of those, in turn, is subject to politics, bureaucracy, endless acquisition regulations and the organizational culture of the military—the constants of getting things done in DOD.

Readiness is "what the entire department [DOD] does," said Dr. Laura Junor in a July 10 interview with Army AL&T. For Junor, a former senior defense readiness official who holds a Ph.D. in applied microeconomics, the military is one massive and massively complex supply chain serving up a single product: "to secure the nation's defense," she said. For everyone along that supply chain, readiness represents distinct priorities.

NO 'FIRE AND FORGET'

What to do to make Army acquisition ready? As Junor sees it, readiness for the acquisition community "is recognizing that acquiring a weapon system or even a Soldier is not the end, it's the beginning. Unless we buy that with all of its spares, with a full understanding of what it's going to take to make that capability deployable when we need it, we're not being effective." So, for example, in buying a new weapon system, that means understanding "the training requirements, what type of people you need, especially now as we're moving into a new and exciting realm of unmanned systems."

All of those long-term costs should be factored in on the front end of the acquisition process, Junor said, so that "we buy something that we know how to keep operating." Otherwise, the risk is what she described as a "fire and forget" approach to acquisition program management. "I ask that [program managers] make sure to consider not just the specs of the weapon but all of the things that are involved in the sustainment of that capability going forward: the type of the labor that's required, the training, the spares and the maintenance."

After years in "the building," as Junor and many others call the Pentagon, she is director of the Institute for National Strategic Studies at National Defense

NEW CHALLENGES EN ROUTE

U.S. Army Reserve Soldiers from the 316th Sustainment Command (Expeditionary) (316th ESC) have supported the fight against the Islamic State group in the U.S. Army Central Command area of operations by providing fuel, life support and munitions, including those delivered by these UH-60 Black Hawks to Forward Operating Base Shalalot, Iraq, in July. While the U.S. military has focused on violent extremism, it also faces threats from peer and near-peer adversaries with capabilities designed to limit its ability to project power. (U.S. Army photo by Sgt. Christopher Bigelow, 316th ESC)

SHOW OF FORCE

An M270 Multiple Launch Rocket System assigned to the 210th Field Artillery Brigade, 2nd Republic of Korea (ROK)/U.S. Combined Division fires an MGM-140 Army Tactical Missile into the East Sea off South Korea, July 5. The launch demonstrated the deep-strike capabilities that allow the ROK/U.S. alliance to neutralize threats in the region—an important capability given recent technological advances that U.S. adversaries have made while the U.S. has been battling nonstate foes like al-Qaida and the Taliban. (U.S. Army photo by Staff Sgt. Sinthia Rosario, 5th Mobile Public Affairs Detachment)

University. She served in the Office of the Secretary of Defense (OSD) as deputy assistant secretary of defense for readiness, where she built the foundation of OSD's current readiness and training portfolio. Before her current post, she was principal deputy undersecretary of defense for personnel and readiness.

Junor understands readiness not just on the academic level but also on a personal level. While she was living in Louisiana, Hurricane Katrina devastated New Orleans. During the preceding years, she said, "the country was still so reeling from 9/11 that any tiny little town that wanted a big communication bus with satellites and all that—they got front-end funding for that." The problem was the absence of any kind of sustainment funding.

When Katrina hit in 2005, "a whole bunch of those buses were sitting in vacant lots because [of] what they didn't have," she said. "They didn't have people to operate or keep them going. And where that seems an extreme example, it's really not that extreme. It happens on a more subtle level throughout the department every day."

THE VIEW FROM ACQUISITION

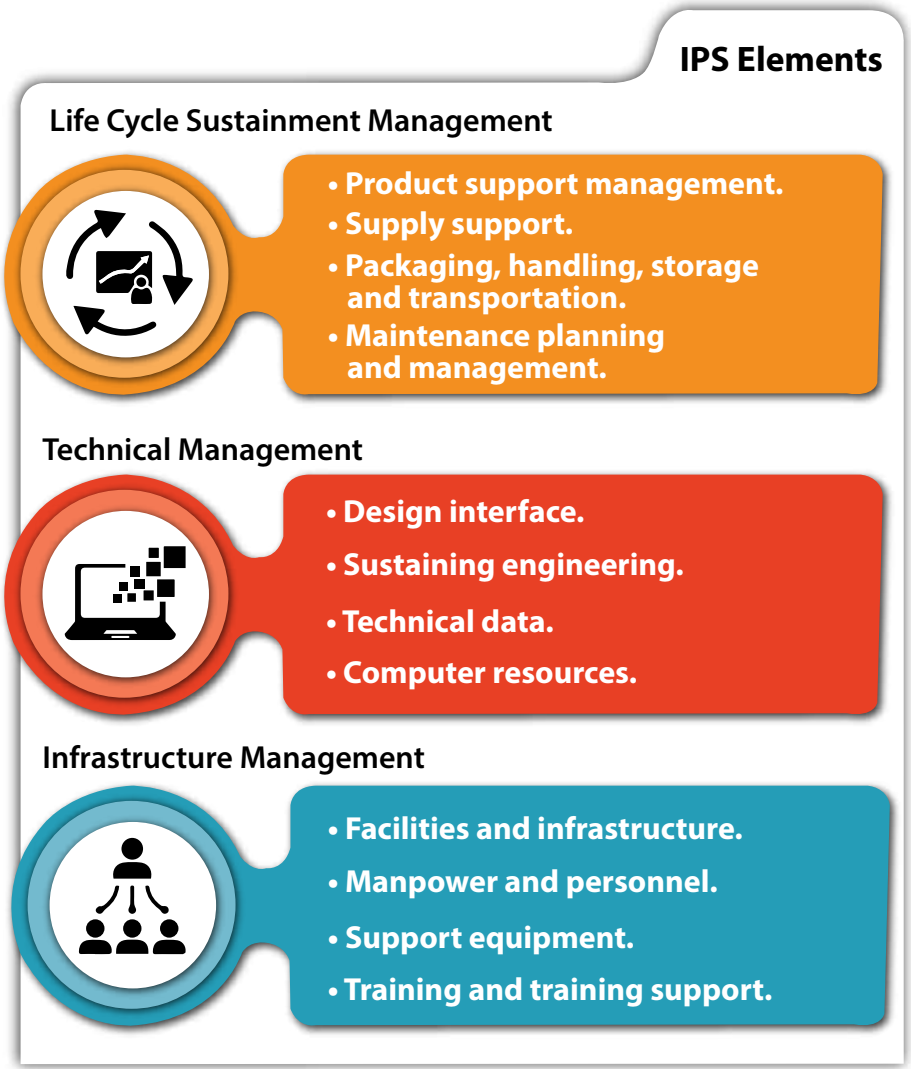
From where retired Army acquisition officers John T. Dillard and Raymond D. Jones sit, with the benefit of long-distance hindsight, the first step in figuring out acquisition's role in readiness is to understand what it isn't. Both retired colonels now teach at the Naval Postgraduate School (NPS). The next step is to define how the acquisition workforce can sync up more effectively with the other major players early and often in the acquisition process, while recognizing that certain essential factors—namely funding—are outside the control of Army acquisition.

Dillard fundamentally agreed with Junor's observations based on his Army experience. Before joining the faculty of NPS' Graduate School of Business and Public Policy, Dillard, senior lecturer, held a variety of Army acquisition assignments, including assistant project manager for the Army Tactical Missile System and the Javelin Anti-Tank Missile System.

Jones, a lecturer in acquisition management at NPS, served nearly 30 years in the Army, culminating in his assignment as the deputy program executive officer for the Joint Tactical Radio System, a program since reorganized. Army AL&T

"Can we do what we need to do today plus that whole four-plus-one? Simultaneously, no. We've never been able to do that."

FIGURE 1



BETTER INPUT MEANS BETTER OUTCOME

The acquisition process often slows down when there's not enough collaboration between the materiel developer and the combat developer to understand the impacts of specific features on a system or item that Soldiers are asking for. These integrated product support (IPS) elements provide a good framework to consider various important factors. (SOURCE: Defense Acquisition University)

editors discussed readiness with Dillard and Jones in a July 11 phone interview.

Dillard referred to "Army Regulation [AR] 220-1, Army Unit Status Reporting and Force Registration – Consolidated Policies," which establishes the Defense Readiness Reporting System – Army, among other things, to break readiness down into three major components: personnel, equipment and training. In the course of his 26-year Army career, he grew familiar with AR 220-1 as head of the readiness reporting branch of the 6th U.S. Army, comprising National Guard and Reserve units in about 15 Western states.

Acquisition's piece of the readiness picture is primarily equipment, Dillard said: "Do I have the vehicles, weapons and other things on hand versus authorized, and are they in a state of ability to be used? Acquisition certainly affects the training piece, training devices and other things, but largely it's the equipment piece, more so than the personnel piece. It's the design of our systems, which is really important for reliability and availability and maintainability so that the equipment portion of the readiness rating is as high as it can be and stays that way."

THE REQUIREMENTS FACTOR

Designing systems involves the requirements community, too, of course. But the acquisition community can influence the shape and scope of requirements to a significant extent, said Dillard and Jones. In the case of an armored vehicle, for example, "the number of hours, the number of track paths, the number of gallons of gasoline burned—those kinds of things can be variable," Dillard said.

"The need is what it is. The materiel developer doesn't get a vote when it comes to the need," Jones said. "Where we do get a vote is how the need is developed. We've got to go all the way back to the beginning of the process" to best support readiness.

Program managers (PMs) tend to focus on awarding the right contracts and complying with acquisition regulations, Jones noted. "We don't spend a lot of time saying to ourselves, 'If you had just changed that design, or if we had done it this way, we wouldn't have had to add one more hour of training on the back end,' and

COVERING THE LANDSCAPE

In a recent joint forcible entry training mission out of Fort Bragg, North Carolina, the Army's Global Response Force successfully used En-route Mission Command (EMC) to enable real-time joint intelligence, communications and collaboration as the U.S. troops flew across the country to battle simulated enemy forces. EMC is an example of a capability with far-reaching potential that calls for the acquisition workforce to sync up early and often with the other major stakeholders. (U.S. Army photo courtesy of 82nd Airborne Division)

that training then impacts the personnel community and the finance community, etc.," he said.

"We kind of understand the complexity and the level of effort it's going to take to sustain that [system] at a high level of readiness for the user, because of what the future war-fight environment is going to look like. Where we tend to start to break down—and I'm not going to blame the requirement system because that would be too simplistic—is that we don't collaborate between the materiel developer and the combat developer sufficiently to understand the impacts of the design or the thing that we're asking for."

A good place to begin in balancing requirements, Jones said, are the 12 integrated product support elements. (See Figure 1.)

"You start asking the people developing these ideas, 'How is that going to look in the sustained base? What is the level of training burden that we're asking?' Everybody is off doing their job, but it's not synchronized because we didn't spend enough [on what] I'll just call systems engineering early on."

Over the past 20 years, requirements have grown more realistic, and Army acquisition has absorbed gradually more responsibility for long-term logistics, Dillard said. But a PM still has to balance a long product cycle with a relatively short time on the job, he noted. "It's unforeseen how much the system is going to get used, it's unforeseen what's going to be the weak part. And so it's a bit of a crystal-ball type problem," Dillard said.

"We just have to make sure that the stuff that goes into that system view, which supports the operational view, meets the

LOOKING DOWN THE LINE

Soldiers assigned to 3rd Armored Brigade Combat Team, 1st Armored Division (3/1 AD) train in military operations on urban terrain at Fort Bliss, Texas, in June. For defense readiness expert Laura Junor, readiness for the acquisition community means recognizing that acquiring a weapon system for Soldiers to use is not the end but the beginning of providing capabilities. "Unless we buy that with all of its spares, with a full understanding of what it's going to take to make that capability deployable when we need it, we're not being effective." (Photo by Staff Sgt. Killo Gibson, 3/1 AD Public Affairs)

requirement that we're given. … In that regard, we [in acquisition] view it differently because we're looking at it through a tighter lens"—namely reduction of total ownership cost, which "can be huge," from invention to procurement to sustainment, Dillard continued.

"But somebody has to build the architecture … and if you go into a room of users and materiel developers and services and you ask who owns that operational view, everybody would raise their hand," he said.

THE MONEY FACTOR

In addition to their inability to control a system's long-term sustainment needs, defense acquisition PMs must work within a number of financial constraints that limit their ability to guarantee readiness.

"The brutal, honest truth of the matter is, PMs only control two colors of money: R&D [research and development] money and production money. It's the units that spend that O&M [operation and maintenance] money every year," Dillard said. "And that's where your real readiness is, because that's where your operational availability is, in terms of spare parts, gallons of gas, things like that.

"We're not going to go dig up a PM 10 years later and beat him because a vehicle costs more to operate than he said it would when he was designing it," Dillard said. Rather, "we're asking the users to constrain their requirements by cost and affordability that can only be informed by people on the acquisition side saying, 'Well, you want it to go 90 miles per hour, it's going to cost this much; if you want to go 95 miles per hour, it's going to cost this much.' "

If the inability to predict a system's future use weren't a tough enough challenge for the acquisition community, there have been serious problems of unpredictable funding over the past several years, which have derailed the ability of the Army and DOD to plan for readiness, or even measure current readiness, in a rational way.

However, Junor said, "budgets didn't create our readiness crisis. But they made a hard problem, for a finite period of time, impossible to solve. And now I'll back up and say difficult to solve. … These readiness pipelines don't pop out. It's not a gumball machine where you stick in 25 cents and boom, you've got a readiness capability. It takes a minute to grow our forces, especially since … we grow our own."

> *"The need is what it is. The materiel developer doesn't get a vote when it comes to the need. Where we do get a vote is how the need is developed. We've got to go all the way back to the beginning of the process."*

THE READINESS CRISIS

For years, DOD leaders have warned of a readiness crisis born of a perfect storm of partisan politics, 16 years of war in Iraq and Afghanistan, and rising peer and near-peer potential adversaries. "Our first priority is continuing to improve warfighter readiness begun in 2017, filling in the holes from trade-offs made during 16 years of war, nine years of continuing resolutions and Budget Control Act caps," Secretary of Defense Jim Mattis told the Senate Appropriations Committee's defense subcommittee in June.

Continuing resolutions, forced by Congress' failure to pass appropriation bills on time and required to keep the government running, hold spending to prior-year enacted levels and stop any new programs that were not previously funded. The Budget Control Act of 2011 imposed a projected $1.2 trillion in spending cuts over 10 years, divided evenly between defense and discretionary domestic spending.

"The services are essentially operating in three fiscal quarters per year now," Adm. John M. Richardson, chief of naval operations, told the Senate Armed Services Committee in September 2016. "Nobody schedules anything important in the first quarter."

"Failure to pass the budget, in my view as an American citizen and the chief of staff of the United States Army, constitutes professional malpractice," Milley told the House Armed Services Committee in April.

While the U.S. has been battling nonstate foes such as al-Qaida, the Taliban and the Islamic State group, China, Russia, North Korea and Iran have been closing the technology gap that U.S. forces demonstrated to such great effect during the Persian Gulf War in 1991. "While we've been primarily focused on the threat of violent extremism, our adversaries and our potential adversaries have developed advanced capabilities and operational approaches specifically designed to limit our ability to project power," Marine Corps Gen. Joseph F. Dunford Jr., chairman of the Joint Chiefs of Staff, told the Senate Appropriations defense subcommittee in June.

Asked at the September 2016 Senate Armed Services Committee hearing whether they "would have the resources and ability to defend this nation against present and future threats if we continue down this path of sequestration," the four joint chiefs—Milley, Richardson, Marine Corps Commandant Gen. Robert B. Neller and Air Force Chief of Staff Gen. David L. Goldfein—answered emphatically: No.

"The only thing more expensive than deterrence is actually fighting a war," Milley told the committee, "and the only thing more expensive than fighting a war is fighting one and losing one."

"Over the same eight-year period in which we reduced the Army by 100,000 Soldiers, continuing resolutions and constrained funding under the Budget Control Act of 2011 forced us to pay short-term bills at the expense of long-term investments," Milley and then-acting Secretary of the Army Robert M. Speer said in a written statement to the Senate Armed Services Committee in May. "A consequence of underfunding modernization for over a decade is an Army potentially outgunned, outranged, and outdated on a future battlefield with near-peer competitors."

Invoking a phrase coined by retired Army Gen. Frederick J. Kroesen, former vice chief of staff of the Army and former commander in chief of U.S. Army Europe, Dillard said readiness is "the lion in the fight" for limited resources, while the jackal is acquisition, trying to sow the seed corn for future modernization efforts.

Kroesen, now a senior fellow of the Institute of Land Warfare at the Association of the United States Army, sees Army readiness in a "dire" situation. "The downslope that began at the end of the Cold War has not been interrupted ever since, and the past eight years did nothing but deepen the curve," he stated in response to questions from Army AL&T. "Army readiness today is limited to only a portion of the total force, those committed to the combat requirements being pursued."

Meanwhile, he wrote, "the portion of the Army stationed in the U.S. is in many stages of unreadiness and the future of the Army is in grave doubt because the R&D portion of the budget has been badly depreciated for the last almost 30 years. Yes, the situation is dire," Kroesen concluded. "The current administration's proposals are only the first baby steps in what will be a long climb to a true ready capability."

CONCLUSION

Ultimately, the Army Acquisition Workforce supports the warfighter's readiness to fight by understanding, balancing and, to the extent it is able, incorporating the warfighter's capability needs in system design and production.

"The combatant commanders are very much go-to-war oriented today—we used to say 'tomorrow'—and they don't think about the long-term impacts" of system design, Dillard said. "Who does? Don't you always turn down the warranty when a guy is selling you the washing machine or the television? Nobody thinks about the operations-and-support end of it.

"It's very human, I think, to push that off, and it's human on the part of the PM, too: The [logistics] support manager comes in and says, 'Hey let's talk about logistics,' and the PM is saying, 'Are you kidding me? I just want to demonstrate vertical flight.' "

In sum, then, can the Army fulfill its No. 1 priority, to be able to put Soldiers where they need to be, when they're needed, with the capabilities that they need?

"Can we do what we need to do today plus that whole four-plus-one? Simultaneously, no," Junor said. "We've never been able to do that. So then the smart issue is, all right, what can we do? We have two responsibilities, to target specific production pipelines to cover as many of those requirements as possible, and to very clearly articulate what we've missed and why that matters."

As to the role of Army acquisition, she said, "We're pretty harsh on them—the global 'we'—because of the extreme stories that come out about the cost and the slow pace and all that kind of stuff. But we also aren't fair in that we don't come to them with steady, predictable requirements for them to respond to."

"Put yourself in the warfighter's shoes for a second," Jones said: "I know what my mission is, I know what I've got. We've got to fight with what we have. We put a plan together, and we execute our plan." That crystal-clear operational environment is one thing, but outside of it, things are much more ambiguous.

"There are going to be changes out there that you didn't anticipate. And so when we approach these programs, we need to put those things into our thought process. What happens if, for example, we have a depression in five years? What happens if Congress decides to do something weird, like a sequestration that nobody believed would ever happen and then all of a sudden it happens? We spend more time arguing and fighting those things than we do just recognizing that that's just part of the environment. I think the process is fine. It's how we implement the process."

Junor echoed that sentiment. For her, one of the issues with readiness is DOD itself. "DOD is a big traditional institution," she said. "It does not move fast. So when you ask it to change direction, it doesn't do it quickly, it just doesn't." Readiness means money, and when money is tight, the

"The only thing more expensive than deterrence is actually fighting a war, and the only thing more expensive than fighting a war is fighting one and losing one."

STANDING READY

Gen. Mark A. Milley, U.S. Army chief of staff, hands out coins Aug. 10 to Soldiers assigned to 2nd Cavalry Regiment during Exercise Noble Partner 2017 in Vaziani, Georgia. Noble Partner is designed to prepare the Georgian military for its contribution to the NATO Response Force. Milley's emphasis on readiness as the Army's No. 1 priority has sparked far-reaching conversation on what readiness is and how it can be achieved. (Photo by Capt. Judith Marlowe, 2nd Cavalry Regiment)

services fight over it. Not only that, the services fight themselves.

"And the problem is that our military folks change jobs every few years," she said. "So in order for them to make a change like this, they're going to have to go to war inside their organization with probably all the people who have been there for a long time that are wedded to the status quo, and most won't do that. They just won't do it."

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COL. WAYNE E. BARKER

COMMAND/ORGANIZATION: Project Manager for Soldier Warrior, Program Executive Office for Soldier

TITLE: Project manager

YEARS OF SERVICE IN WORKFORCE: 18

YEARS OF SERVICE IN MILITARY: 26 (including almost two years as an enlisted Soldier)

DAWIA CERTIFICATIONS: Level III in program management and contracting

EDUCATION: M.S. in national resource strategy, Dwight D. Eisenhower School for National Security and Resource Strategy; M.S. in management, industrial procurement and contracting, Florida Institute of Technology; B.B.A., Marshall University

AWARDS: Dwight D. Eisenhower School and National Contract Management Association Award for Excellence in Research and Writing; National Reconnaissance Office Director's Circle Award

Integrating systems, experiences

"If you want to have a direct impact on the Soldier, you will be hard-pressed to find a place where you will have a greater positive impact than PM SWAR and PEO Soldier." Col. Wayne E. Barker should know: He is the project manager for Soldier Warrior (PM SWAR) in the Program Executive Office (PEO) for Soldier at Fort Belvoir, Virginia.

"In PM SWAR, as well as PEO Soldier, we focus on providing our Soldiers the kit they need to ensure that they never go into a fight without the advantage," he said. It's a pretty big mission, with PM SWAR housing three organizations: the Product Manager for Ground Soldier Systems, which provides dismounted situational awareness via Nett Warrior; the Product Manager for Air Warrior, providing aviation life support and safety systems as well as pilot situational awareness; and the Project Director for Soldier Systems and Integration, which supports power and hearing protection platforms and the Soldier Enhancement Program, and ensures that various systems across PEO Soldier work together smoothly and with minimal demand on the Soldier.

"For PM SWAR and throughout PEO Soldier, the biggest challenge is integration," said Barker. "Each new technology that comes out means a new challenge if the interfaces are not managed correctly. We try to bring all of it together while managing space

OPEN LINES OF COMMUNICATION

Barker, left, briefs civilians, military members and industry representatives in April at Fort Belvoir on the mission and capabilities of PM SWAR. Integration of systems, which Barker considers the biggest challenge of his work, requires good communication at the earliest stage of development, he said. (Photo by PM SWAR staff)

and weight constraints and reducing the burden—cognitive as well as physical—on the Soldier." For PM SWAR, a systematic approach to integration helps identify problems early on, "at the concept or design stage rather than during production," said Barker.

That effort includes conversations as early as possible in the development phase and integrated product teams that involve a variety of stakeholders. "We want to make sure that the equipment being developed in one PM shop doesn't conflict with the space and weight claims for equipment being developed in other PM shops, that they're complementary. The ultimate goal is to ensure that the Soldier can use whatever capability we develop without any problems," he said.

Barker's career followed an atypical path. "When people ask me how I got here, I usually joke that it's because I haven't been able to hold a job," he said. Barker enlisted in the Army in 1988 as a field artillery forward observer, eventually earning a Green to Gold Scholarship and entering the officer corps as an infantry officer. He spent four years with the branch detail program, which transitioned him to the Military Intelligence Corps. "I completed three years as a military intelligence officer, and during the latter part of my company command, I was exposed to the wide range of opportunities in acquisition," he said. "The thought of doing something other than [in] the tactical world I had lived in was intriguing." He submitted a packet and became an acquisition professional as a senior captain.

That was in 1999. Barker spent the first six years in a highly classified environment as director of contracting. "When it came time for my O-5 command, the Army selected me to be a program manager at the National Reconnaissance Office, and that served as my transition to the program management side."

Between that post and his current one at PM SWAR, which began in September 2015, he served as the executive officer (XO) for the Hon. Heidi Shyu, then the assistant secretary of the Army for acquisition, logistics and technology and the Army acquisition executive. That assignment was one of several "leaps of faith" that shaped his career, Barker said. "When I was selected to interview with Ms. Shyu, I was not well-known, given all the time I spent in the classified world. She took a leap of faith on me as a relatively unknown lieutenant colonel, and I am so thankful she did. Ms. Shyu taught me so much about patience, resilience and listening, along with so many other things, and I carry those with me today in both my professional and personal life."

Another leap that shaped his career was his assignment to the highly classified job, which he was told little about. "The culture of that organization was that of the quiet professional: not caring who gets credit but caring only that the job gets done," he said. "The position provided daily feedback on what we were doing to impact the global war on terror. Working in an environment as dynamic as that was an invaluable experience."

In addition to the leaps, Barker noted the career-shaping contributions of several mentors. "Lt. Col. John Carmichael, my second battalion commander, looked out for me in so many ways and taught me what it meant to be a good officer and an even better man." Lt. Gen. Paul A. Ostrowski has also served as a mentor, when he was a PM with U.S. Special Operations Command and when he served as PEO for Soldier—first during Barker's time in the classified world and later when he was Shyu's XO. "He helped me in my early days as I was learning to navigate the waters of the Army staff, the Office of the Secretary of Defense and the Pentagon."

During his tour as XO, Barker also had the opportunity to work with Maj. Gen. Harold J. Greene, then Shyu's deputy for acquisition and systems management. (Greene later served as deputy commanding general of the Combined Security Transition Command – Afghanistan and was killed in August 2014 in an attack by an Afghan soldier in Kabul.)

"Aside from having a brilliant mind and being an esteemed acquisition professional, he reminded me every day that if you're not laughing and having fun, you're doing something wrong," Barker said. Greene passed along some job-related advice that still resonates. "He said the things you can always control are doing a good job and having a good work ethic, wherever the Army sends you or whatever it asks of you. If you can do those simple things, you will be surprised at the doors that will open. He was a very wise man."

For Barker, trust is the key to success, and trust is built with time. "Get to know your people and those you work with on a daily basis, and you will be amazed at the trust you build," he said. "When things are tough … they are there for you." Time in the classroom is important, too, he added, for more than just book smarts. "Schooling and certifications help establish a baseline skill set and provide the opportunity to make important friendships and connections. You'll find out how small the world is when you start to run into people you've met throughout your career."

—MS. SUSAN L. FOLLETT

PARTNER SUPPORT

U.S. Army Soldiers assigned to 2nd Brigade Combat Team, 101st Airborne Division fire an M777A2 howitzer in support of Iraqi security forces during the December 2016 Mosul offensive. The FY17 NDAA changes the authorities for DOD to conduct training-and-equipping programs, to create a flexible tool for combatant commanders to help partners. (U.S. Army photo by Spc. Christopher Brecht, Combined Joint Task Force – Operation Inherent Resolve)

SECURITY COOPERATION *for the* 21st CENTURY

Strengthening allied nations' defense abilities through training, equipment sales and other forms of cooperation is a vital part of U.S. national security. The FY17 NDAA was the first such measure to recognize this by reorganizing and reforming the security cooperation enterprise.

by Mr. Jim Stocks and Mr. Adam Genest

Security cooperation—the United States government's effort to build partner capacity through the provision of defense articles, military training and other defense services—has been a critical component of U.S. national security policy for decades. In recent years, people within and outside DOD have studied how to better organize and execute the government's security cooperation mission in the 21st century. As a result of these efforts, Congress has recognized the strategic importance of security cooperation and has introduced a once-in-a-generation reform effort to equip the department with the tools for operating in today's dynamic and challenging environment.

The National Defense Authorization Act (NDAA) for Fiscal Year 2017, signed by President Barack Obama on Dec. 23, 2016, contains far-reaching reforms for security cooperation authorities. These reforms represent a significant opportunity to restructure security cooperation throughout DOD and will have wide-ranging impacts across the Army. In aggregate, the statute will reform the security cooperation workforce; enhance the flexibility, transparency and oversight of security cooperation authorities and resources; and improve the alignment of security cooperation activities with defense strategy.

CROATIA BOUND
Thirty-two OH-58D Kiowa Warriors with the 82nd Combat Aviation Brigade conduct a farewell flight over Fort Bragg, North Carolina, in April 2016. Croatia received the first of 16 surplus OH-58Ds in August 2016 through the Excess Defense Articles and FMS programs. The FY17 NDAA places some new restrictions on FMS contracting. (U.S. Army photo by Sgt. 1st Class Michael Cox)

SECURITY COOPERATION WORKFORCE REFORM

The changes with the biggest impact will likely be those related to the workforce. The establishment of a distinct security cooperation workforce called for in the FY17 NDAA is the equivalent of the Defense Acquisition Workforce Improvement Act (DAWIA) for the security cooperation community. The FY17 NDAA directs workforce changes that are very much modeled on the success that DAWIA has had in establishing education and training standards and requirements for the acquisition workforce. When fully implemented, we will have clearly identified the security cooperation workforce, established career development and certification requirements and linked those requirements to staffing for key DOD and Army security cooperation-related positions.

The legacy of this legislation will be the establishment of a well-defined workforce, capable of fostering an entire career within security cooperation. Professionals in the field will have wide-ranging career-enhancing opportunities that will provide the opportunity to grow and lead within the security cooperation enterprise. These changes will establish a pool of talented and experienced employees from which future senior leaders in security cooperation will be selected, mentored and given an opportunity to guide the enterprise.

OVERSIGHT AND MANAGEMENT

Another important change includes the requirement to assign responsibility for security cooperation policy, oversight and allocation of resources to a single official within the Office of the Secretary of Defense. This will streamline oversight responsibilities for programs, activities and resource planning and allocation that are currently scattered across DOD. The secretary of defense has designated the undersecretary of defense for policy as the official responsible for security cooperation. In addition, the law consolidates management responsibilities within the Defense Security Cooperation Agency, supporting the development of a single security cooperation budget and facilitating greater integration of planning and implementing the new train-and-equip authority discussed below. This consolidation and streamlining

will enable a more coordinated approach to security cooperation that is aligned with national security and foreign policy objectives.

TRAIN-AND-EQUIP AUTHORITIES

The law also makes dramatic changes in the authorities for DOD to conduct training-and-equipping programs in support of the combatant commanders. The previous hodgepodge of narrow and targeted train-and-equip authorities was consolidated to create a flexible tool for combatant commanders to build partner capacity. These changes broaden the scope of the mission and expand the types of partner forces eligible for participation beyond traditional defense forces, to include not just military but also police and other nonmilitary security forces. In addition, funding duration was increased to enable development of holistic and structured solutions to partner needs.

CHALLENGES

The NDAA included a few provisions whose impacts were not quite as positive. Most notable was what—according to congressional staffers and written comments from the conference committee on the final measure—was a seemingly unintended negative impact on the Special Defense Acquisition Fund (SDAF). The SDAF is a revolving fund that provides a method for effecting advance procurements to reduce international customer waiting time, as well as a source of urgently needed articles. In an effort to bolster the SDAF program, the FY17 NDAA increased the authorization for the program to $2.5 billion. However, the increase came with a caveat that a significant portion of the authorization be spent on procuring and stocking precision- guided munitions (PGM). The DOD interpretation of this requirement has led to challenges in using SDAF for non-PGM acquisitions, which has hampered the effectiveness of the overall program.

The NDAA also placed some restrictions on foreign military sales (FMS) contracting that may negatively impact program execution. The law requires the use of firm fixed-price contracts for FMS (with some provisions for exceptions), which limits a contracting officer's ability to choose the appropriate contract type to deliver best value to the FMS customer. In addition, limitations were placed on the use of undefinitized contract actions (UCAs) for FMS. (UCAs are contract actions for which the contract terms, specifications or price are not agreed upon before performance commences.) Pricing goods and services for FMS is often complex and challenging, largely because of variations in terms of allowable costs such as sales promotions, demonstrations and related travel for sales to foreign governments, and offset costs. The NDAA limitations effectively eliminate the use

SPECIAL DELIVERY

Personnel from the Combined Security Transition Command – Afghanistan's Security Assistance Office inventory cargo with representatives from the Afghan National Army at Hamid Karzai International Airport in Kabul in September 2016. The FY17 NDAA streamlines oversight of programs, activities and resource planning and allocation. (U.S. Army photo by U.S. Navy Lt. Christopher Hanson, Resolute Support Headquarters)

A SHARED DEFENSE

Georgian soldiers stand in formation July 29 at Vaziani Military Base, Georgia, during the opening ceremony of Exercise Noble Partner, an exercise of Georgia's light infantry contribution to the NATO Response Force. The FY17 NDAA makes major changes to U.S. efforts to build partner capacity by providing training, defense articles and other defense services. (U.S. Army photo by Sgt. David Vermilyea, 173rd Airborne Brigade)

of UCAs for FMS because of the difficulty in meeting the new timeline restrictions to define and finalize the terms of the contract. These limitations reduce needed flexibility in FMS and have the potential to increase costs for both international partners and the U.S. In addition, this NDAA provision breaks with a fundamental tenet of the FMS program, in that our international partners are no longer afforded the same acquisition process we use for our own procurements.

CONCLUSION

The FY17 NDAA makes major changes to how security cooperation is conducted in DOD. These changes will have lasting impacts on the security cooperation community and will create conditions to ensure improved responsiveness to combatant commander requirements. This comprehensive reform demonstrates a recognition of the importance of security cooperation in advancing national security. In the aggregate, this legislation made positive, far-reaching changes that will improve security cooperation throughout DOD.

For more information, contact Jim Stocks at ***james.a.stocks.civ@mail.mil****.*

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ONE ACQUISITION PROCESS AT A TIME

From the standpoint of ASA(ALT)'s test and evaluation unit, there's a better way to support T&E events, one that would directly improve operational readiness.

by Ms. Laura Pegher, Mr. Adam Bussey and Ms. Amber Dufour

In an acquisition environment concerned with all things cost, schedule and performance, logistics and product testing historically have tended to be an afterthought or overlooked altogether. The Army places a high priority on validating performance requirements in various developmental and operational tests, but acquisition test events such as the logistics demonstration (log demo) and verification of the technical manual often take a back seat.

Based on historical data, the U.S. Army Forces Command (FORSCOM), along with other Army commands, Army service component commands and depot replacement units, have experienced significant challenges with sourcing log demos and technical manual verification events. Sourcing is the term used for applying Soldiers as a test resource. This takes the Soldiers in high-demand military occupational specialties (MOSs), specifically maintainer MOSs, away from their primary duties and deployment training while giving the test community a real-user experience.

Technical manual verification timelines can range from two weeks up to a year, depending on the system complexity, and the average technical manual verification requires five Soldiers as test users. The sourcing challenge is primarily because of the long durations of these events, with negative impacts on unit operational readiness as Soldier maintainers are pulled away to support the event. Given the current state of available resources, test and evaluation (T&E) requirements are exceeding the Army's capabilities across the force. Thus, the Army must develop solutions to set clear priorities and supply T&E events with adequate resources in order of importance.

THE ARMY RESOURCING PROCESS

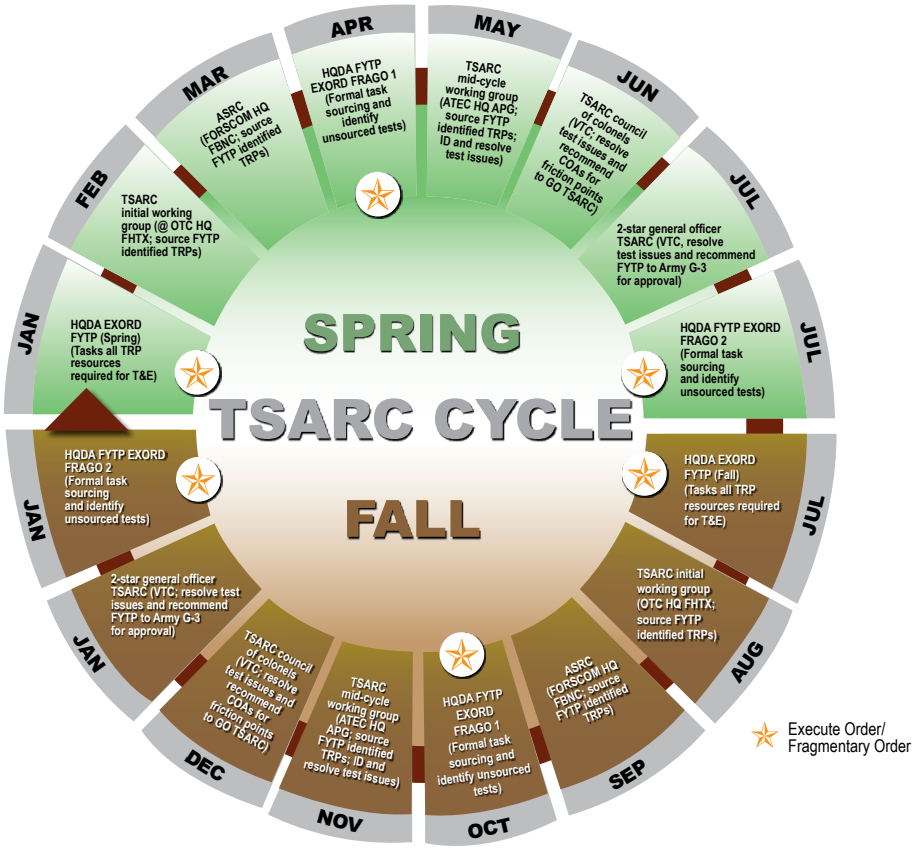
The Army currently uses a committee called the Test Schedule and Review Committee (TSARC) to manage resources for Army tests, multiservice operational T&E, joint T&E and experiments or demonstrations. The TSARC is responsible for maximizing the use of limited resources while minimizing the test events' impacts on unit operational readiness. The TSARC's primary functions include:

- Coordinating all required test resources.
- Synchronizing tests.

FIGURE 1

TSARC'S WHEELHOUSE

TSARC coordinates a lot of moving pieces, managing resources for Army tests, multiservice operational T&E, joint T&E and other events. Through working groups, conferences and small-group sessions, TSARC's members from various ranks and commands balance test needs against the many other demands on Soldiers' time. (Graphic by U.S. Army Acquisition Support Center)



KEY

APG: Aberdeen Proving Ground, Md.
ASRC: Army Force Generation Synchronization and Resourcing Conference
ATEC: U.S. Army Test and Evaluation Command
COA: Course of action
EXORD: Execute order
FBNC: Fort Bragg, N.C.
FHTX: Fort Hood, Texas
FORSCOM: U.S. Army Forces Command
FRAGO: Fragmentary order
FYTP: Five-year test program
GO: General officer
ID: Identify
OTC: U.S. Army Operational Test Command
T&E: Test and evaluation
TRP: Test resource plan
TSARC: Test Schedule and Review Committee
VTC: Video teleconference

- Reviewing schedules.
- Managing support to experiments, investigations, demonstrations, technical manual verifications, studies and other efforts that generally do not require a T&E master plan.
- Validating resource requirements and providing recommendations to the deputy chief of staff, G–3/5/7 for approval or disapproval.

The TSARC process occurs twice in a given fiscal year, with a spring cycle and a fall cycle, and has multiple levels: the initial working group, the mid-cycle working group, the council of colonels and a two-star general officer forum. (See Figure 1.) Each of these groups identifies, coordinates and attempts issue resolution. If needed, the issue is then elevated to the next level. Test resource plans (TRPs), the formal resource document developed by the requesting organization, are submitted to the TSARC for appropriate validation, prioritization and sourcing. All TRPs are cross-checked with all potential force providers to ensure efficient and appropriate use of Army resources.

Participants in the TSARC include the U.S. Army Test and Evaluation Command (ATEC), HQDA G-3/5/7, the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)), HQDA G-8, FORSCOM, the U.S. Army Training and Doctrine Command (TRADOC), the deputy undersecretary of the Army for T&E and the U.S. Army Pacific Command.

PLAN B: CIVILIANS

Recently, there has been discussion among ATEC, ASA(ALT), HQDA G-3/5/7 and HQDA G-8 on how best to source the log demo and technical manual verification events. Several questions typically arise:

- How long is the event?
- How many Soldiers are required?
- What type (MOS) of Soldier is required for the event?
- What is the impact if the event goes unsourced in this cycle?
- What is the drop-dead date for resources?

- What is the test window for completing this effort?

These discussions have resulted in a better understanding of overall logistics product development, the importance of proving out a weapon system's product support package before fielding and the difference between a log demo and technical manual verification. TSARC considers the log demo a higher-priority event to source with appropriate MOS-qualified Soldiers, given the return on investment for the Army in proving out the maintenance concept and baseline product support strategy.

There are several ongoing initiatives to help reduce resourcing requirements while maintaining an acceptable level of risk for weapon system materiel release decisions, specifically in the area of supportability. The most notable initiative with regard to sourcing is a proposal to change the language of "Army Regulation [AR} 25-30, Army Publishing Program." AR 25-30 currently requires that technical manual verification be conducted 100 percent hands-on by Soldiers, meaning that every step of the manual is executed by the users. Recently, the U.S. Army Combined Arms Support Command (CASCOM) and HQDA G-3/5/7 have made formal requests to include a requirement of less than 100 percent hands-on technical manual verification and an option to use government civilian personnel in lieu of Soldiers. These proposals were also presented at the June council of colonels TSARC and approved at the June general officers TSARC.

BREAK IT DOWN

Soldiers verify procedures to separate an engine from a generator set at Detroit Arsenal in January. It can take five Soldiers and two to 52 weeks to verify that a technical manual is accurate and usable; proposals to allow log demos and technical manual verifications to occur simultaneously aim to reduce the drain T&E can have on readiness. (Photos by John Lillis, TACOM Life Cycle Management Command)

The Army must develop solutions to set clear priorities and supply T&E events with adequate resources in order of importance.

These requested changes, if accepted by the Office of the Administrative Assistant to the Secretary of the Army, would allow greater flexibility when evaluating the usability and accuracy of technical manuals, and create a more agile publication development process.

The TSARC encourages requesting organizations to continue to pursue Soldiers in support of all test events, including the technical manual verification. However, the TSARC also encourages development of a plan B in the event the TSARC cannot source the event with Soldiers. This is a shift in the technical manual verification culture; once approved, pilot events would begin, with the future policy and process updates to follow. It would take six to 12 months to incorporate the proposed policy changes and another year or

READING THE FINE PRINT

Maintainers walk through the steps to remove a generator set from a chemical-biological protective shelter at Detroit Arsenal in January. Army regulations require that technical manual verification be conducted completely by Soldiers. However, CASCOM and HQDA G-3/5/7 have made formal requests to ease that requirement and permit government civilian personnel to replace Soldiers.

two to implement fully. Opening up the support resource pool to include civilians presents potential relief to strained Soldier resources. This guidance is in the formal approval process, coordinated among ASA(ALT), ATEC, TRADOC, the U.S. Army Materiel Command, CASCOM and HQDA.

CONCLUSION

The Army has much work to do to apply these proposed changes, and is well on its way to making other changes to the outdated technical manual processes. A proposal is on the table to implement a three-pronged approach:

- Leverage additional resources (government civilian personnel) to source the technical manual verifications, reducing the demand on Soldiers.
- Use a CASCOM-proposed sampling methodology in lieu of the current 100 percent hands-on approach, effectively reducing timelines for events.
- Combine log demo and technical manual verification events for low-risk acquisition category III programs, condensing the resources required and alleviating the demand.

There are several upcoming opportunities in FY18 to pilot the use of government civilians and a proposed sampling methodology. These pilots could be a mechanism to gain insight and feedback on the implementation of a more agile and flexible technical manual development process. The results will be key to supporting the chief of staff of the Army's No. 1 priority, readiness.

For more information, email the T&E coordination team at ***usarmy.pentagon.hqda-asa-alt.list.dasm-te@mail.mil****.*

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A *new* 'FACE' *for* Aviation ACQUISITION

Using the Future Airborne Capability Environment open-system approach to disrupt the current acquisition process.

by Dr. Alicia Taylor

Technology is changing and progressing rapidly. Upgrades to sensors, cameras, communication devices and navigation have improved not only automobile safety, but also our driving experience. When it comes to incorporating new technologies, the automotive industry has an advantage over military platforms because the automotive industry's business model is entirely different. Whereas most consumers might upgrade a vehicle by buying a new one, the military generally plans on a 30-year life cycle for a vehicle, and upgrades the actual vehicle instead of replacing it. That includes aviation vehicles.

So, while many vehicle components or systems are common across many different models produced by a particular manufacturer in the commercial sector, that is currently not always the case with military aviation platforms.

Military aircraft, whether rotary, fixed-wing or unmanned, have numerous capabilities in common: navigation, communications and situational awareness. Traditionally, these capabilities were developed for each aircraft, effectively making DOD pay for countless reinventions of the wheel. DOD acquisition rules and regulations are

"With the FACE approach as a common, well-understood framework, it is easy to dive into BALSA and replace its transport services segment with our implementation in a matter of days."

STAYING ON COURSE

ADS-B technology uses satellites to identify the position of an aircraft instead of the older, radar-based tracking system. (Illustration by Shannon Kirkpatrick, PEO Aviation)

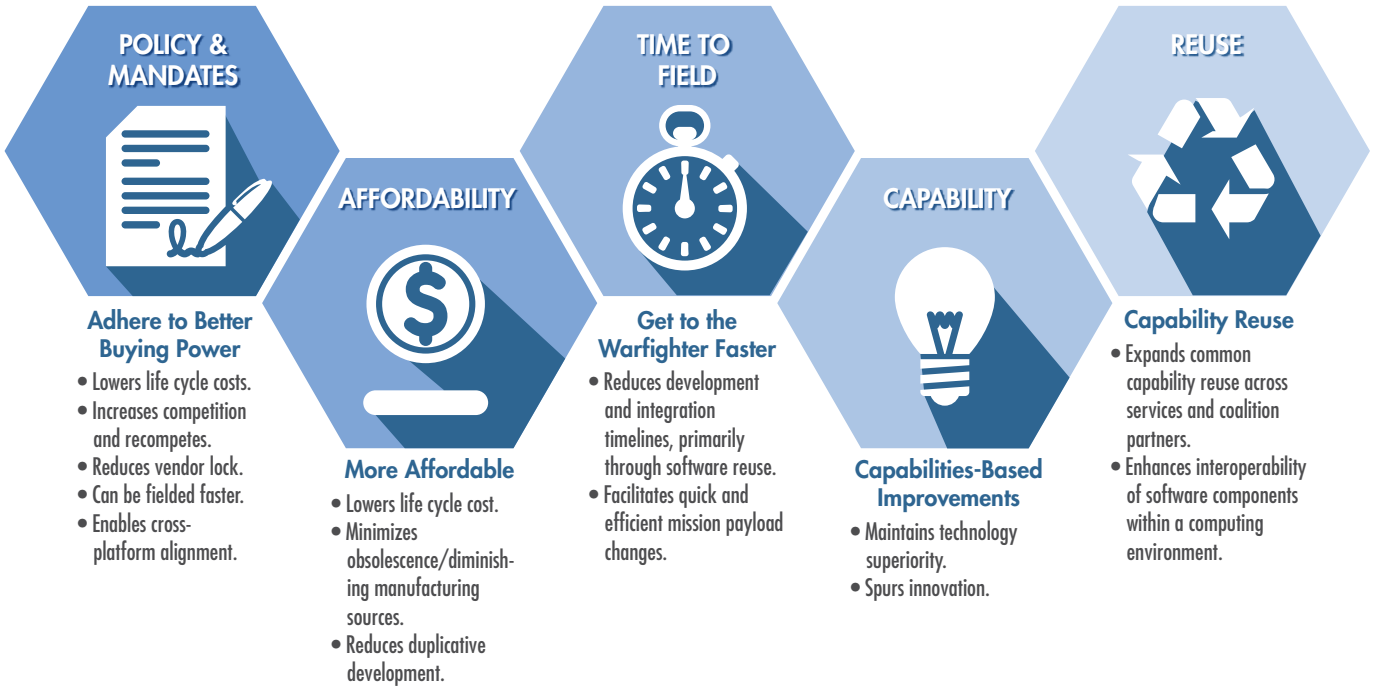
numerous and complex. Most are absolute requirements, whereas others are only highly recommended. This complexity and lack of absolute direction are impeding the ability of software engineers to reuse software. That reuse is essential to support rapid, cost-efficient integration of new technologies.

Nevertheless, DOD leadership, members of Congress and other agency personnel are implementing measures designed to improve the acquisition process and strengthen requirements. The National Defense Authorization Act (NDAA) for Fiscal Year 2017 calls for the use of modular open-systems approaches in major system platforms, components and interfaces. More specifically, major defense acquisition programs receiving milestone A or B approval after Jan. 1, 2019, should be designed and developed with a modular open-systems approach to the maximum extent practicable. The Defense Acquisition Workforce Improvement Act requires DOD to provide training and education for the acquisition workforce. Courses, modules and resources are available on open systems. References to the use of open systems can also be found in Defense Acquisition University's Defense Acquisition Guidebook.

OPEN SYSTEMS 101

What are open systems? What they sound like: systems designed and developed to a consensus-based technical standard that employs a modular design with interfaces. These interfaces enable modules to "talk to" one another with minimal modifications, in much the same way that a home computer can interface with a variety of other systems—printers, scanners, input devices and the like. Open systems are designed to enhance interoperability and reuse. Any software developer has access to the system standards, whereas

FIGURE 1



KEY BUSINESS DRIVERS

The FACE Consortium approach uses business processes, technical practices and a software standard that enable modularity, portability and interoperability. Reusing software across multiple platforms reduces development costs, integration costs and fielding time. (Source: The Open Group)

in closed, proprietary systems, typically it's only the vendor who has access. Open systems promote competition precisely because they are open and therefore can lead to better access to cutting-edge technology. Figure 1 provides an overview of the multiple benefits of open systems.

The Open Group Future Airborne Capability Environment (FACE) Consortium, a partnership of more than 90 government, academic and defense industry organizations, has defined an open-system avionics architecture for all military airborne platform types. (See related article, "About 'FACE'," Army AL&T magazine, April – June 2015.)

With more than 1,300 members, the FACE Consortium is a consensus-based organization—that is, all documents and publications are developed through committees, subcommittees, standing committees and working groups, then reviewed by the membership and approved by a steering committee. This ensures that the architectures, technical standards and other documents are developed and agreed to by all of the major stakeholders in airborne systems. Because the development is a bottom-up approach by subject matter experts from both industry and DOD, the documents include well-understood and acceptable tools and procedures.

The FACE Consortium's approach is designed to advance modularity, portability and interoperability through consistent business processes, technical practices and a software standard. The reuse of software across multiple platforms reduces development costs, integration costs and time to field.

Software suppliers develop capabilities that meet the requirements of the FACE technical standard and allow the exchange of data between FACE components. The FACE technical standard contains requirements for architectural segments and their software components; it defines key interfaces that link the segments together. The FACE conformance program then certifies that the requirements of the FACE technical standard have been met and allows the software vendor to legitimately claim the product to be FACE-conformant. This provides prospective

customers, including government program managers, with assurance that the software is, in fact, reusable and portable in a FACE environment.

Adopting an open architecture based on a common set of standards promotes development of capabilities that can be reused across multiple platforms. This eliminates or greatly lessens design and development efforts and reduces integration timeline costs. It is also more efficient. If a baseline profile of the specific requirements of these common capabilities is created by analyzing the platform systems and subsystems, then specific software products can be developed to target these common capabilities. Figure 2 illustrates how some of these capabilities (situational awareness, navigation and communications) developed to meet the requirements of one or more of the FACE operating system segments can be reused across multiple aircraft platforms.

WHY THE CONSORTIUM APPROACH WORKS

Adopting a standards-based open architecture like the FACE approach can reduce nonrecurring engineering costs—those things that are paid for once during product development. Under the current acquisition process, each platform develops separate systems independently despite having the same requirement. That means each pays separately to develop an individual solution at a cost similar to the other platforms. Developing one standard solution to employ across all platforms saves money by eliminating the cost of producing separate, redundant systems. Figure 3 illustrates the reduction in cost that occurs when a software solution is developed once and used across all platforms. This savings could be applied to other unfunded requirements, thus contributing to an overall increase in warfighter capability that otherwise would not occur.

FIGURE 2

USE ACROSS PLATFORMS

Capabilities developed for one FACE operating system segment can be reused across multiple aircraft platforms. (Source: The Open Group)

A real-life example that illustrates the principles behind the FACE Consortium's approach is the Federal Aviation Administration's requirement that all aircraft, including military and civilian, have Automatic Dependent Surveillance – Broadcast (ADS-B) technology. This new positioning surveillance technology is more advanced, using satellites to identify the position of an aircraft instead of the older radar-based tracking system.

ADS-B is composed of two parts: the ADS-B out, which broadcasts aircraft position-related information, and the ADS-B in, which receives information from ground control and other aircraft. The position of an aircraft is identified by satellites, then the information is broadcast to ground control and other aircraft via the ADS-B out. Information is then received by the ADS-B in.

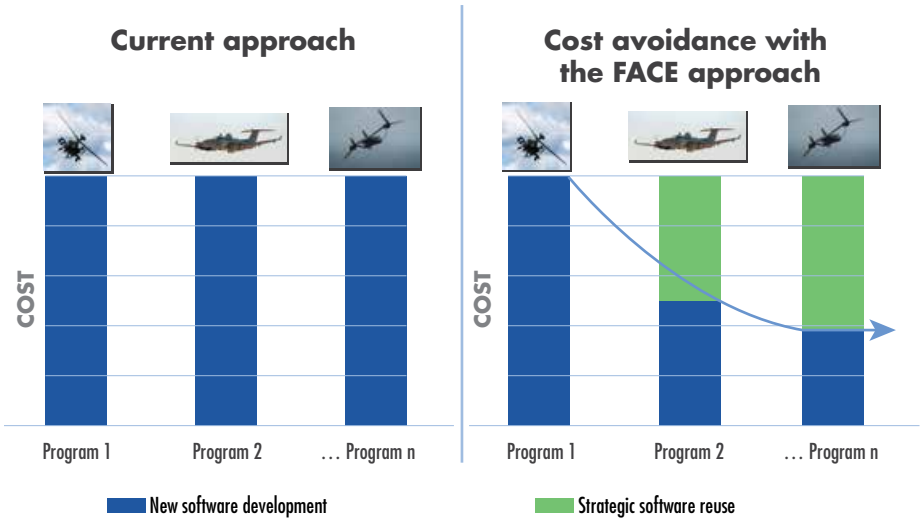
Suppose platforms A and B are legacy systems and need to be fitted with an ADS-B out. Platform A has agreed to pay supplier A to develop and install an ADS-B out. Supplier A's ADS-B out is tightly coupled with proprietary hardware and software on platform A, so it is more difficult and costly to add to other aircraft. Software that is tightly coupled tends to work in one system and usually requires significant reprogramming to work in another system, thereby reducing the capacity for integration.

Platform B has contracted with supplier B for the development and installation of a different ADS-B out. Supplier B has aligned the components of ADS-B out with the FACE technical standard, meaning that key interfaces are used to allow information to be passed between existing software and hardware on the platform and the new ADS-B out. Supplier B's ADS-B out has also been developed and tested, so the costs to fit it

to other aircraft and the time to field will be significantly reduced.

If the government controls the avionic interfaces that ADS-B out uses, the cost savings increase exponentially. The FACE architecture, composed of segments and standardized interfaces, allows the components of FACE-conformant software to talk to one another. Eliminating duplication of development efforts saves the costs of developing functionality multiple times. If the effort is built to the FACE standard with proper architectures, the government can save on integration costs across multiple platforms. Because any vendor can develop a solution based on the open architecture guidelines, the FACE technical standard increases competition and avoids "vendor lock," which is generally more expensive and slows a project down.

FIGURE 3



CUTTING DUPLICATION

Reusing software allows DOD to pay just once for software development, and is essential to support rapid, cost-efficient integration of new technologies. (Source: The Open Group)

SHOWING FACE ALIGNMENT

Since 2011, the U.S. Army, Navy and Air Force have awarded more than $1 billion through various proposals and other procurement solicitations aligned to the FACE technical standard. The FACE Consortium also hosts a number of activities to showcase FACE-conformant products and to demonstrate how different software aligned to the FACE standard can be integrated together.

"The BITS event served as an opportunity for software suppliers to get their feet wet using the FACE approach for designing software."

Among these are technical interchange meetings (TIMs), open to the public and hosted by the Air Force, Army or Navy. The February 2016 Army TIM featured 31 exhibitors and 11 technical papers, and an Air Force TIM held in March had 29 exhibitors and 10 technical paper presentations. The Navy TIM is scheduled for Oct. 17 at the Holiday Inn Solomons Conference Center and Marina in Solomons, Maryland. It begins at 8 a.m. with a keynote address followed by presentations and exhibits.

Another important activity hosted by the consortium, the Basic Avionics Lightweight Source Archetype (BALSA) Integration and Test Session (BITS), is a technical integration event open to FACE Consortium members only. At the BITS event, software suppliers gain firsthand experience integrating their software products—developed to align with the FACE technical standard—with BALSA software. When two or more software applications are integrated, it means that lines of code or interfaces are added to allow the software products to work together without any issues. At the December 2016 pilot BITS event, six FACE Consortium member organizations demonstrated the ease of integration, shared lessons learned and level of effort needed to perform the integration. One company integrated three components with BALSA to trace a radio-controlled car with GPS and to perform a trip playback that enabled the car to drive itself over its charted path. Another demonstration involved two companies using BALSA to integrate four components and three external devices.

Feedback from the participants was very positive. All participants stated that the

TIME FOR AN UPGRADE?

Soldiers assigned to 16th Combat Aviation Brigade (CAB), 7th Infantry Division conduct maintenance in July on a CH-47 Chinook helicopter at Bagram Airfield, Afghanistan. The CH-47 is an example of an aircraft that could benefit from using the FACE architecture when incorporating upgrades. (U.S. Army photo by Capt. Brian Harris, 16th CAB)

The reuse of software across multiple platforms reduces development costs, integration costs and time to field.

BITS event was a valuable integration experience. "The BITS event served as an opportunity for software suppliers to get their feet wet using the FACE approach for designing software," said Chris Crook, systems software analyst with Intrepid Inc., a small business provider of services and technologies in the federal marketplace. "The occasion gave vendors the chance to see a working example of a FACE reference architecture, BALSA; dive into it to see and understand how the pieces work together; then learn how to use those pieces in unison with their own software and share what they learned." Immediately after the BITS event, three software companies spent four hours working together to integrate six components and four external devices with BALSA.

Four teams representing 10 FACE Consortium member organizations participated in the June 2017 FACE Consortium BITS event. One team, composed of three recent college graduates, integrated a commercial off-the-shelf GPS with BALSA on a Raspberry Pi. The Raspberry Pi, developed by the U.K.-based Raspberry Pi Foundation, is a small, low-cost, programmable, powerful computer found around the world. It uses an open-source operating system and was designed to encourage users to learn programming by tinkering. Feedback from a second team underscored the ease of replacing one of the components in BALSA with that same component from their software. "With the FACE approach as a common, well-understood framework, it is easy to dive into BALSA and replace its transport services segment with our implementation

in a matter of days," said Henry Liao and Shaun Daimonji, software engineers in the Autonomous Systems Division of Northrop Grumman Aerospace Systems. (The transport services segment allows data to pass between software located in other segments.) "We got a taste of what it would be like to integrate our component into another FACE system, and it's really not too bad. The clearly defined segment boundaries and data paths make the task straightforward." A third team integrated multiple software products with the messages tied together by a shared data model. Some of the products from this team have been certified through the FACE conformance program. The final team built on its integration activity from the pilot BITS event by controlling a fixed-wing aircraft instead of a radio-controlled car.

The encouraging results from the BITS events and the TIMs suggest that software suppliers are developing software products aligned to the FACE technical standard and that companies are integrating those products. The number of solicitations and proposals aligned to the FACE technical standard that have been awarded since 2011 is also encouraging. The next steps are to identify common capabilities across military aircraft, use modular open-systems approaches in major system platforms, components and interfaces, and eliminate DOD acquisition rules and regulations that inhibit the reuse of software.

CONCLUSION

"The FACE Consortium members have reached the mountaintop in developing an implementable standard that enables vendors to develop capabilities that meet the government's need for an open architecture-based solution for avionics software. I am pleased with the progress that we are making in populating our repository with FACE-conformant products and with the participation in our integration workshop activities," said Dr. Terance Carlson, chief information officer/G-6 for the Program Executive Office (PEO) for Aviation and FACE Consortium chairman. "Our next steps include expanding awareness of the FACE standard and its value through training, and increasing the adoption of the FACE technical standard across the aviation program offices in each of the DOD services."

The implementation of the FACE technical standard aids in meeting some of DOD initiatives and requirements, such as DOD Instruction 5000.02, and the FY17 NDAA. Enforcing open-system architectures and effectively managing technical data rights aid in cost control by promoting effective competition for the life cycle systems. The FACE approach is the chosen open software standard for PEO Aviation, to be applied to existing and future platforms.

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DR. ALICIA TAYLOR, a contractor with QuantiTech Inc., is an information technology project and planning analyst supporting PEO Aviation's chief information officer/G-6. She provides technical expertise in the development, implementation, integration and testing of the FACE technical standard and other FACE Consortium documents. She is active in the FACE Consortium and chairs several subcommittees and working groups. She holds a doctorate of education in educational leadership from Northcentral University and an M.A. and B.S., both in mathematics education and both from the University of Alabama. She has also completed several Defense Acquisition University courses, including Fundamentals of Systems Acquisition Management, DOD Open Systems Architecture, Modular Open Systems Approach to DOD Acquisition, and Software Reuse.

FACE TAKES FLIGHT

Sara Kambouris, Gilbert Lucero, Jeffrey Wallace and Dean Garvy, of Infinite Dimensions Inc., display a fixed-wing aircraft at Whittier Narrows Airfield in Rosemead, California, that uses the FACE architecture. Infinite Dimensions works on the next generation of systems integration using interoperability, artificial intelligence and virtual reality. (Photo courtesy of the author)

FINDING THE TARGET

Soldiers from Korea, Alaska, Japan and Hawaii compete in the U.S. Army Pacific Command's 2017 Best Noncommissioned Officer and Soldier Competition at Schofield Barracks, Hawaii, June 11-15. The competition included evaluation on the M320 grenade launcher, which could soon get new tactical and training rounds, thanks to the efforts of PM MAS and PD MCA.
(U.S. Army photo by Staff Sgt. Joseph Moore, Eighth Army Public Affairs)

NEXT GENERATION *of* 40 MM

New family of munitions enhances training and increases capabilities and lethality.

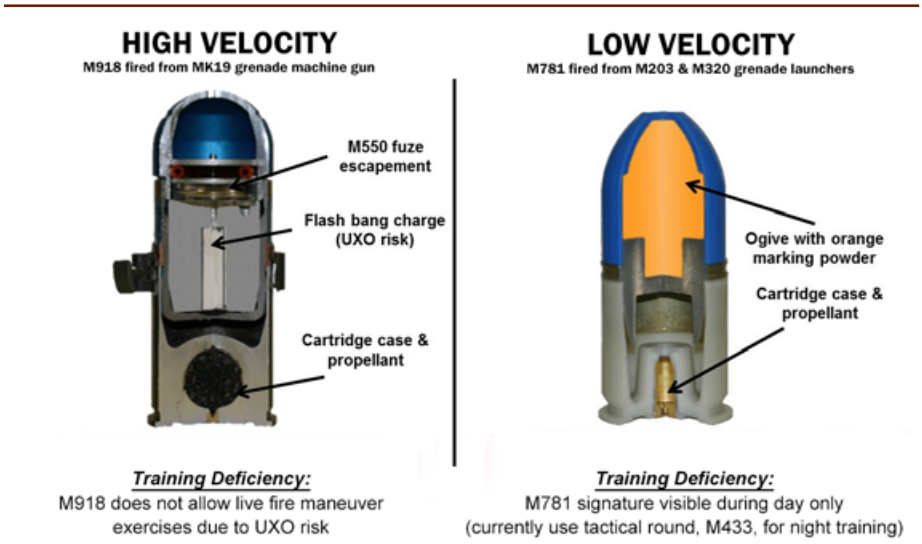
by Mr. James Terhune

For nearly 30 years, 40 mm grenades have been a mainstay on the battlefield, undergoing little more than safety and reliability improvements. In 2009, the Army set out to take advantage of new technologies to help counter evolving threats and new tactics and to provide more realistic training to warfighters. The Product Director for Medium Caliber Ammunition (PD MCA), part of the Project Manager for Maneuver Ammunition Systems (PM MAS), has created plans for the development of the next generation of 40 mm grenades.

The 40 mm grenade family contains both high-velocity (HV) grenades, which are fired from MK19 grenade machine guns (GMGs) mounted on vehicles as well as dismounted, and low-velocity (LV) grenades, which are fired from handheld weapons. The primary 40 mm HV tactical round is the M430A1 High-Explosive Dual Purpose (HEDP) cartridge. It is fired to a maximum range of 2,200 meters and is capable of penetrating three inches of steel and inflicting personnel casualties. The primary 40 mm HV training round is the M918/M385A1 Mixed Belt Target Practice (TP) configuration. It provides a realistic signature, defined as a distinguishable visual characteristic or mark, that can be seen as far out as 1,200 meters.

LV grenades are used with the handheld M203 and M320 grenade launchers. The primary 40 mm LV tactical round is the M433 HEDP, which is designed to penetrate lightly armored targets and inflict personnel casualties in the target area. The

FIGURE 1



BETTER TRAINING FOR LESS

In addition to developing ammunition that's fielded to troops in theater, PM MAS and PD MCA developed solutions to improve ammunition used in training while complying with requirements for unexploded ordnance (UXO). Over a five-year production time frame, the HV TP-DNT training round would save approximately $98 million over costs associated with the current M918 round, left, and the LV TP-DNT would save about $3 million when compared with costs for the M781 round. (SOURCE: PM MAS)

primary 40 mm LV training round is the M781 TP cartridge, which provides a signature for daytime training only.

NEW CAPABILITIES

From 2008 to the present, PD MCA has worked with the U.S. Army Maneuver Center of Excellence to generate and coordinate multiple 40 mm Family of Ammunition capability development documents (CDDs) and capability production documents (CPDs) to bring new capabilities to the warfighter. These documents identified a number of capability gaps:

- "Provide the Soldier the ability to fully train on the capabilities of the 40 mm GMG and develop the skills necessary to conduct military operations. Non-dud producing: Greater maneuverability for Soldiers and platforms. Engage targets under limited visibility – Takes full advantage of night vision devices." (From several initial capability documents (ICDs), joint capability documents and related CDDs and CPDs.)

- "Warfighters lack the ability to achieve desired accuracy and incapacitating effects against personnel targets in defilade [protected from hostile ground observation and flat projecting fire by an obstacle, such as a wall or hill], at ranges out to 500 meters." (Small Arms Capabilities-Based Assessment (CBA), April 2008.)

- "Precisely and quickly defeat, out to 500 meters, enemy combatants, their personal equipment, and thin-skinned targets in defilade positions while limiting collateral damage." (Counter Defilade Target Engagement CDD, January 2011.)

- "Squads lack the ability to conduct ballistic breach at ranges up to 50 meters and conduct rapid (single-shot) breach without pause between actual breach and entry of initial force." (Small Arms CBA, April 2008.)

- "Platoons lack the ability to achieve desired accuracy and incapacitating effects with volume fire up to 2,400 meters." (Small Arms CBA, April 2008.)

- "The solution set with the highest potential was the development of an integrated airburst weapon system … consisting of an integrated weapon, target acquisition/fire control and ammunition. An integrated airburst weapon system provides a significant capability for engaging targets in defilade, one of the more challenging tasks identified in the [Small Arms] CBA." (Counter Defilade Target Engagement ICD, August 2008.)

The 40 mm Family of Ammunition CDDs and CPDs have established the Army's requirements for the HV and LV 40 mm grenade families to be revamped to increase training readiness and lethality, and have enabled the start of multiple research and development programs. Several programs are currently in a range of development stages:

- 40 mm HV/LV TP – Day Night Thermal (TP-DNT) M918E1/M781E1: Provides an impact signature that can be seen day or night, by the unaided eye and through current and future thermal and night vision sights. It achieved milestone C in May 2017.

- 40 mm High Explosive Air Burst (HEAB), LV, XM1166: Provides enhanced accuracy, lethality and range against infantry in the open and in

defilade. It will achieve milestone B in FY18.

- 40 mm Door Breach, LV, XM1167: Allows for an in-stride ballistic breach—eliminating the need to set up additional, cumbersome equipment—of a door at ranges up to 50 meters, creating an entry point into a building or other urban structure. It will achieve milestone B in FY18.

- 40 mm HV, Improved High Explosive Dual Purpose (I-HEDP): Provides enhanced accuracy and lethality to defeat a target in the open and in defilade. It will achieve milestone B in FY18.

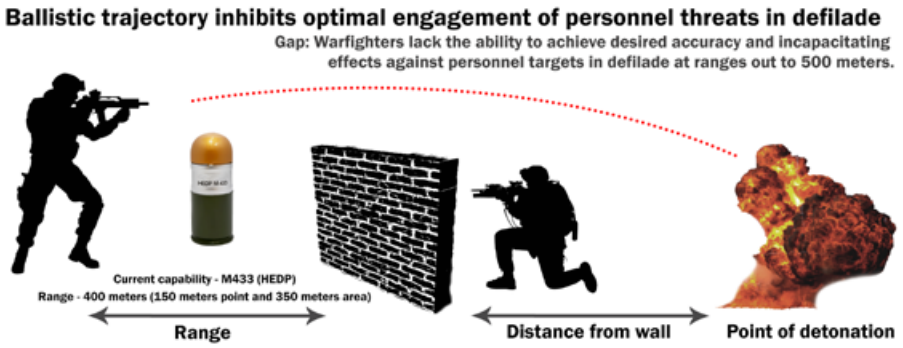
ENHANCED TRAINING

Training on the systems that Soldiers use in combat, including the 40 mm grenade family, improves readiness and mission effectiveness. The Army and other services use 40 mm grenade machine guns and grenade launchers within the tactical environment for offense, defense, patrolling and urban operations in all environments, day and night. Improvements in night-fighting capabilities, including thermal sights, and battlefield tactics have led to training gaps for LV grenade training. Additionally, unexploded ordnance (UXO) concerns restrict HV grenade training to static firing ranges, which allow only dud-producing munitions and limited maneuver training. Dud-producing munitions are rounds that contain explosives in which the fuze has not initiated. Although the M918 Training Round contains very little explosive and the probability of a dud is less than 1 percent, it still can pose a UXO risk. (See Figure 1, Page 40.)

By FY19, the 40 mm TP-DNT program will make training more realistic by delivering 40 mm HV and LV grenade training cartridges with impact signatures that can be seen at any time, by the unaided eye and through current and future thermal and night vision sights. The cartridges will contain pyrophoric material, which produces the visible signature and replaces the existing explosive, thereby removing the UXO risk and allowing Soldiers to conduct maneuver training exercises. In addition, the program will provide the Army a significant cost savings over the munitions life cycle while increasing warfighter readiness. A cost-benefit analysis, submitted with the requirements packet, showed that over a five-year production time frame, HV TP-DNT saves approximately $98 million over current M918 costs, and LV TP-DNT saves about $3 million over current M781 costs.

Airburst technology is being developed for the M203/M320 weapon platform to provide rapid defeat of defilade personnel targets at extended ranges, effectively increasing warfighter readiness by providing state-of-the-art technology with new engagement capabilities. When deployed against point and area targets, such as a single enemy combatant in defilade or multiple enemy combatants in the open, the HEAB XM1166 cartridge will enable a grenadier to inflict incapacitating effects against personnel at increased ranges beyond those offered by the current M433 HEDP—up to 600 meters, from the current range of 400. (See Figure 2.) Additionally, the increased range of the XM1166 will allow grenadiers to employ lethal effects against targets throughout the full range of military operations with improved accuracy and at greater standoff ranges, increasing survivability.

FIGURE 2



GAP BREACHER

With current ammunition options, warfighters lack the ability to engage personnel targets in defilade—concealed by obstacles like hills or walls. PM MAS is working on a handful of options that will eliminate that gap. (SOURCE: PM MAS)

NEW OPTIONS ON THE WAY

A U.S. Soldier assigned to 1st Battalion, 10th Special Forces Group (Airborne) fires an MK19 grenade launcher at Baumholder Military Training Area, Germany, in May. PM MAS worked with the Maneuver Center of Excellence to provide new ammunition options for warfighters, including a round for the MK19 that will increase accuracy and lethality and reduce UXO. (U.S. Army photo by Erich Backes, Training Support Activity Europe)

Today, Soldiers conduct structure breaching with mechanical, explosive and ballistic methodologies. Mechanical and explosive methods put Soldiers at an increased risk of injury because of the close proximity to the enemy. The Grenade Rifle Entry Munition, the current ballistic method, is heavy, requires a long engagement time, is difficult to accurately place on the target and yields extensive collateral damage. The 40 mm Door Breach LV XM1167 provides small units with a lightweight round that can conduct a ballistic breach at ranges up to 50 meters without pause between actual breach and entry of the initial force. This allows units to quickly gain access to a building at a safe distance, while enabling them to gain and maintain a tactical advantage. The cartridge will be lightweight, reducing the Soldier's load, and has a low recoil force when fired from the M4/M320, minimizing fatigue. The XM1167 cartridge is expected to be fielded in FY20, and will greatly enhance the warfighter's effectiveness in military operations in urban terrain while increasing safety and survivability.

A 40 mm HV airburst munition CDD is currently going through the Joint Capabilities Integration Development System process, with approval expected by Sept. 30. The I-HEDP is a high-explosive munition that will be able to engage personnel targets in defilade and in the open and defeat unarmored and lightly armored vehicles. The combination of MK19 and I-HEDP will incorporate a fire control and programming unit to allow the gunner to set one of two modes: airburst for concealed and exposed targets, and point detonation for material targets. Additionally, a self-destruct feature will be incorporated to reduce the chance of UXO on the battlefield. The I-HEDP will increase the accuracy and lethality of MK19 gunners, allowing them to engage and defeat targets with less ammunition than the existing M430A1 HEDP. The I-HEDP is expected to be fielded by FY23.

CONCLUSION

For the past eight years, the Army has invested in and developed an executable plan to modernize the 40 mm grenade family. Working together, PD MCA and the Maneuver Center of Excellence have crafted the requirements and culled the best technologies that will enable new advancements in technology to be incorporated into the 40 mm grenade family. Over the next several years, we will deliver new training capabilities to enhance Soldier readiness and develop and deliver new tactical capabilities to increase lethality in combat and win back the advantage.

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HIGH-EXPLOSIVE VERSATILITY

The AMP tank round would give M1A2 Abrams tanks more lethality while combining the functions of four existing rounds—with anti-armor, breaching and anti-personnel capabilities—in a single piece of ammunition.

by Mr. Corey D. Hall

The M1A2 Abrams main battle tank and its current suite of ammunition exist to defeat the hardest targets on the battlefield, normally enemy armored vehicles. The Army's focus on counterinsurgency operations over the past decade presented mainly softer targets. In response, the Army developed and fielded the M1028 canister round, providing some increased short-range capability against enemy personnel. Still, the nature of operations did not provide significant opportunities to bring the Abrams' lethality to bear in combined arms maneuvers.

The Army expects the nature of future conflict to be complex, with adversaries employing tactics across the full spectrum of operations. In his guidance on readiness, Army Chief of Staff Gen. Mark A. Milley has specified the need to address a broad target set, including both nation-state armed forces and targets representative of our counterinsurgency operations. As the nation could call on the Army to address this wide range of threats, with transitions between fights on little to no notice, a new round—the 120 mm Advanced Multi-Purpose (AMP), XM1147, High Explosive, Multi-Purpose with Tracer—will enable unit and strategic readiness for combined arms formations.

FUTURE AMP

This conceptual drawing shows what the AMP round will look like when it is fielded in FY21. As compared with the four tank rounds it will replace, it adds better breaching capabilities and anti-personnel and anti-armor effects. Shrinking the number of tank rounds in use also eases logistics operations, making ABCTs and combatant commanders more nimble. (Image courtesy of Orbital ATK Inc.)

BACK TO BATTLE-TANK BASICS

A barrage of U.S. Army M1A2 Abrams tanks from the 3rd ABCT, 1st Cavalry Division push forward during live-fire pre-deployment exercises at the National Training Center at Fort Irwin, California, in October 2016. The Abrams' core capability, knocking out the hardest targets such as armored enemy vehicles, was sidelined during the last decade of counterinsurgency. But as the Army's readiness focus shifts back to the full spectrum of possible future operations, the Abrams is getting a boost with a new four-in-one round, currently in the engineering and manufacturing development phase. (U.S. Army photo by Staff Sgt. Leah Kilpatrick, 3rd ABCT, 1st Cavalry Division)

The AMP round is in engineering and manufacturing development. When fielded in FY21, it will replace four current tank munitions: the M830 High Explosive Anti-Tank round, M830A1 Multi-Purpose Anti-Tank round, M1028 Canister round and the M908 Obstacle Reduction round. The current suite of 120 mm tank ammunition is mostly purpose-designed, with one round addressing a single type of target. By contrast, AMP would address the targets of all four rounds while also adding capabilities. AMP extends the range of the Abrams' anti-personnel lethality, addressing the threat of dismounted, anti-tank guided missile teams. It also would provide the formation more efficient means of engaging hardened structures such as walls and bunkers. The broad array of target sets that AMP addresses prepares the armored brigade combat team (ABCT) to be ready for the complex and diverse nature of the future battlefield.

Readiness for the future fight requires a return to combined arms operations. With AMP, the Abrams tank would be able to contribute with increased capabilities. Current 120 mm ammunition has effects on some structures but does not facilitate efficient entry. Breaching an enemy-occupied building requires placing infantry Soldiers at risk of entering structures through fixed points (i.e., doors and windows) or putting engineers in close proximity to the target to emplace breaching assets, such as explosive charges or battering rams. AMP will provide the ability to create a breach in a fortified structure—including double-reinforced concrete—that would allow Soldiers to enter, and deliver devastating effects to make their entry safer. The combination of these capabilities in the AMP round will provide the ABCT additional combined arms capability in all operations, enabling them to seize, retain and exploit the initiative.

In addition to improving unit firepower, combining the capabilities into a single round supports strategic readiness by reducing the logistics burden associated

A READIER ROUND

An M1A2 Abrams tank fires a round during tank proficiency qualification for units in the 3rd ABCT, 1st Cavalry Division at Udairi Training Range, Kuwait, in June. By FY21, ABCTs will be fielded the new 120 mm AMP tank round, which increases lethality and aligns with readiness guidance for the Army to be prepared to fight both traditional wars and smaller-scale conflicts. (U.S. Army photo by Sgt. Marty Borton, U.S. Army Central Public Affairs)

with the current suite of ammunition. The current 120 mm inventory includes the M830/A1, M908 and M1028 cartridges, for light armor defeat, obstacle reduction and anti-personnel capabilities, respectively. Combatant commanders responsible for readiness across the range of operations—from conventional war between nation-states to counterinsurgency—must maintain sufficient stocks of all four rounds. In turn, field support units are tasked with maintaining and transporting them. By combining those capabilities into one round, theaters would require fewer total assets to address the same mission while providing combatant commanders maximum flexibility and minimizing maintenance and transport burdens.

CONCLUSION

The M1A2 Abrams will remain in service to the nation for decades to come. As changes in the geopolitical landscape—and the conflicts associated with those changes—occur more rapidly, ABCTs must be ready to respond. The 120 mm AMP program supports that readiness objective, enabling lethal effects against a wide range of targets while reducing inventory requirements and allowing combatant commanders to remain prepared for full-spectrum operations in their theaters.

For more information on the 120 mm AMP cartridge, contact Audra Calloway, Picatinny Arsenal Public Affairs Office, at 973-724-7243 or ***audra.e.calloway.civ@mail.mil****.*

MR. COREY D. HALL is an item manager for the Product Manager for Large Caliber Ammunition, assigned to the Project Manager for Maneuver Ammunition Systems within the Program Executive Office for Ammunition. He holds a Master of Engineering degree and a B.S. in biological systems engineering, both from Virginia Tech. He is Level III certified in engineering and is a member of the Army Acquisition Corps.

MS. ALFREDA GREEN

COMMAND/ORGANIZATION:
Joint Attack Munition Systems Project Office, Program Executive Office for Missiles and Space

TITLE:
Product support manager and logistics director

YEARS OF SERVICE IN WORKFORCE: 32

DAWIA CERTIFICATIONS:
Level III in life cycle logistics; Level I in program management

EDUCATION:
M.S. in business management, Florida Institute of Technology; B.S. in education, Alabama State University

AWARDS:
Army Acquisition Executive's Excellence in Leadership Logistician of the Year Award; Commander's Award for Civilian Service; Achievement Medal for Civilian Service; U.S. Army Materiel Command Outstanding Integrated Product/Weapon System of the Year

Moving forward, giving back

Alfreda Green's realization more than 30 years ago that teaching wasn't the career for her might have left a hole in the classroom, but it was a boon for Army logistics. Since leaving teaching, she has been with the U.S. Army Aviation and Missile Command (AMCOM) and provides support to the Program Executive Office (PEO) for Missiles and Space at Redstone Arsenal, Alabama, working to ensure that Soldiers have the weapon systems and training they need. Most recently—and perhaps most notably—she was named Logistician of the Year as part of the 2016 Army Acquisition Executive's Excellence in Leadership Awards.

"Definitely the highlight of my career," she said. "Having been aware of other leaders in my command who had won previously, it was a big honor for me just to be nominated. And then to find out I had won was incredible. I have always had a lot of respect for the other logisticians who won the award, and I'm honored to be in that category now."

Currently the logistics director and product support manager for the HELLFIRE Missile, Joint Air-to-Ground Missile (JAGM) and the Hydra rocket systems, Green provides oversight of life cycle support plans to make sure they are viable and updated to meet warfighters' current and future requirements. This includes budget planning and execution, reviewing engineering change proposals, fielding equipment, procuring spare parts, resetting deployed equipment, provisioning, and providing technical publications and training. "In my opinion, a logistician's job is one of the top critical positions in any business or government entity," Green said, "because logisticians ensure that a complete and economical life cycle support plan is executable to sustain and maintain quality products."

She's been pretty busy over the past few years. Green has overseen the management of an urgent materiel release of more than 300 guided rockets to warfighters in theater and training for two deploying Army aviation units. To make sure these units received the proper support, she also deployed a logistics representative to facilitate theater

fielding operations. As a result of these efforts, the Advanced Precision Kill Weapon System was successfully deployed in theater for the first time. Additionally, Green established a plan to accelerate conversion and depot repairs of almost 2,000 HELLFIRE missiles to support contingency operations and foreign military sales customers.

She led efforts to partner with DOD customers to share depot costs, which reduced annual Army missile repair costs from $4 million to $3 million. She also supported the reset of equipment from five Army aviation battalions and executed a life cycle sustainment plan to support the engineering and manufacturing development phase of the JAGM. Over the course of her career, she also has supported the Patriot, the Multiple Launch Rocket System, the Avenger Air Defense System, the Javelin and the TOW Weapon System either directly or while serving as a staff lead for the associate missile director.

Green began her career as a GS-5 intern, working as an inventory specialist. "It was a big difference from teaching," she said. "I discovered early on that I really enjoyed it—and it paid well." Training and career advancement opportunities led her to obtain required acquisition certifications, and she eventually became a member of the Army Acquisition Workforce. "I continued to follow this path because I knew it would be advantageous to advancing my career—and it was. It was instrumental in my appointment as one of the first assigned product support managers at PEO Missiles and Space."

THRIVING ON CHALLENGE

Green has always had a lot of respect for colleagues who were honored as Logistician of the Year as part of the Army Acquisition Executive's Excellence in Leadership Awards. In 2016, she joined their ranks by winning the award—"definitely the highlight of my career," she said. (U.S. Army photo by Gloria Bell, JAMS Project Office)

Green didn't anticipate that she'd still be at Redstone some 30 years later. "One reason I've stayed is the flexibility to move into different areas and take on new challenges," she said. "I've never been bored and have found plenty of opportunities for promotion or reassignment. I also found a home away from home: The people here are dedicated to completing the mission in a very collaborative environment." Given her experience, Green's advice to newcomers makes perfect sense: "Keep moving. Don't stay in one place for more than five years. Once you are no longer challenged in a position, it is time to move to something else. Expanding your experience in different arenas increases your knowledge base and opportunities for advancements."

Her career has been marked by significant changes, including advances in missile system technology and personnel and organizational shifts resulting from base realignment and closures (BRAC). Through BRAC, AMCOM and the U.S. Army Materiel Command (AMC) both relocated to Redstone Arsenal. "In addition to those changes, the Soldier-focused life cycle initiative was implemented, and strategic planning was executed to establish the best processes for all of these organizations to work together effectively," she said.

Green said she has benefited from the contributions of a handful of mentors, most notably Lisha Adams, executive deputy to the commanding general of AMC; Barry Beavers, formerly the logistics director for the Joint Attack Munition Systems (JAMS) Project Office; Michael Hartwell, formerly the associate missile director at the AMCOM Logistics Center; and Marvin Smith, formerly the deputy project manager for the JAMS Project Office. "They're outstanding professionals who I wanted to emulate. Each of them gave me the latitude to excel by increasing my duties consistently—sometimes even when I did not want to. And they allowed me to be assigned to different areas, which expanded my skills in strategic planning, budgeting, contracting, supply chain and product support management. That range of experience helped me expand my career to levels I never dreamed I would achieve."

She's now following their example. "I find it imperative to mentor young employees at this point in my career," she said. "I feel obligated to train them to become our successors and great leaders. It's my way of giving back—ensuring that young people are equipped to make sound decisions that lead to great achievements and mission success."

—MS. SUSAN L. FOLLETT

SMALL FIELD, BIG CONTRIBUTIONS

The author, a property management specialist on loan from ACC-APG, has helped PEO IEW&S prepare for congressionally mandated Army audits and has improved communication between PEO IEW&S offices and their servicing contracting centers. (U.S. Army photo by Darrell Fleetwood, PEO IEW&S)

THE IMPORTANCE of KEEPING TRACK

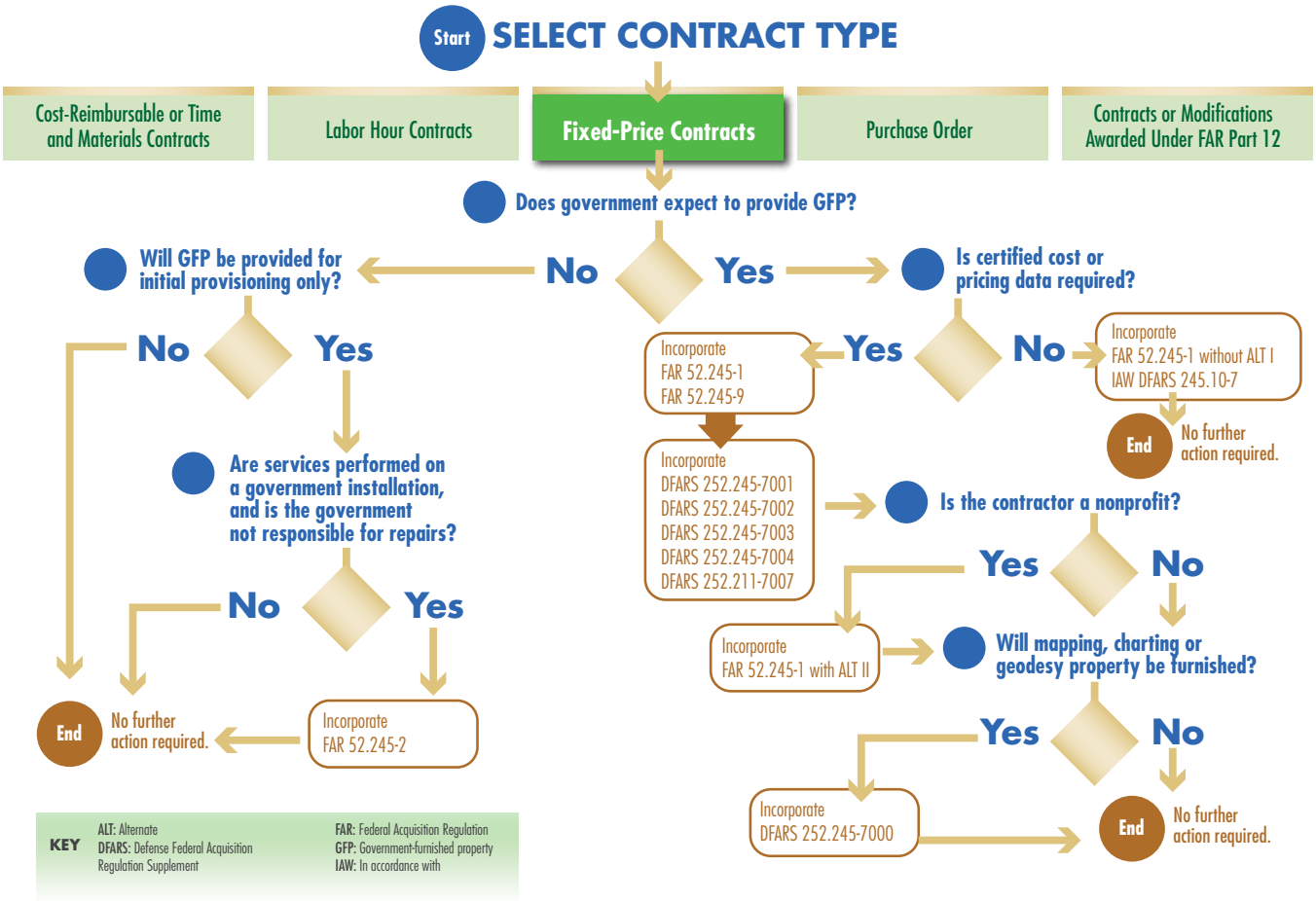
There aren't very many industrial property management specialists, but the work they do to account for government property can be vitally important to DOD and the Army.

by Ms. Sabrina Johns

How important to an organization is accounting for government property? The short answer is "very," but for the long answer, come with me to the Program Executive Office for Intelligence, Electronic Warfare and Sensors (PEO IEW&S) at Aberdeen Proving Ground, Maryland, where a property book officer, a logistics manager and an industrial property management specialist are addressing historical challenges associated with locating, establishing official records for and managing government property within the organization, as well as property provided to contractors.

PEO IEW&S is the first among its peers to develop such a team to begin creating and maintaining required government property records in support of Army audit readiness objectives. The Army is working to achieve auditable full financial statements by Sept. 30, in preparation for a first-ever DOD-wide independent audit in FY18. PEO IEW&S partnered with the U.S. Army Contracting Command – Aberdeen Proving Ground (ACC-APG) to leverage support from me, its industrial property management specialist, to evaluate the tracking of government-furnished property.

FIGURE 1



DECISIONS TO MAKE

Decision trees like this one, which walk an industrial property management specialist through the steps of working with fixed-price contracts, highlight the relevant regulations and details, based on the extent of GFP support. In Army acquisition and throughout DOD, there is a shortage of personnel with the training and expertise to manage government-furnished property, and this is one tool that can show them how to establish clear lines of accountability. (Graphic by U.S. Army Acquisition Support Center)

So, why should you care? Well, the Army Acquisition Workforce Human Capital Strategic Plan reports that there are only 52 people with Defense Acquisition Workforce Improvement Act certification in industrial and contract property management. The number of those who actually work within this career series is even smaller. The lack of industrial property management specialists in the Army and throughout DOD is of concern. They are among the principal stewards of government property, which represents money in a different form, and are critical to identifying and preventing as much fraud, waste and abuse as possible.

Between 2012 and 2016, the DOD Office of Inspector General identified property accountability as an ongoing systemic weakness in contracts and at contractor sites in both the United States and overseas. It also expressed concerns about whether the Army would be prepared to address government property audit requirements for 2017 and beyond, because of challenges in this and other areas. A lack of accountability can lead to unauthorized personnel obtaining access to government property, including weapons and other sensitive items, for use against American citizens and civilians overseas and in the commission of crimes in the United States and elsewhere.

THE CONSEQUENCES OF INACTION

Failing to perform this accountability duty has tangible results, totaling some $3.5 billion across the federal government, according to the U.S. Department of Justice. Some of the more infamous recent DOD cases are:

- In May, Henry Bonilla and Richard Navarro were sentenced in federal court to 15 months and 12 months in prison, respectively, for conspiring to steal over $3 million worth of medical equipment from Marine Corps Base Camp Pendleton, California.
- In February, Philip Tomac, director of logistics at the Logistics Readiness Center at Dugway Proving Ground, Utah, was indicted for mismanagement of equipment valued at between $500,000 and $6 million. The Deseret News reported that Tomac is being investigated for stealing military-grade rifle scopes and other "optic devices." USA Today reported that Tomac is suspected of selling the stolen equipment on the black market.
- In December 2016, Roy E. Friend of Newport News, Virginia, was sentenced to 33 months in prison for stealing government property. According to the U.S. Department of Justice, Friend, a civilian DOD employee who worked at Fort Eustis, Virginia, admitted to fraudulently obtaining goods through a U.S. General Services Administration website.

Federal Acquisition Regulation (FAR) 45.101 defines government-furnished property as "property in the possession of, or directly acquired by, the Government and subsequently furnished to the contractor for performance of a contract."

That's government-speak for "everything a contractor uses to do government work"—from pens to batteries to computers to vehicles. However, providing government property to contractors is an exception to policy, per FAR 45.102(a); contractors ordinarily are required to furnish all property needed for a contract's performance, but this may not be realistic for some fields. A contract information technology consultant certainly isn't going to connect a personal computer to a government network. Likewise, a broadcast contractor probably won't even own the "tools" of that trade because the expense is prohibitive. And if we contracted a dentist or medical professional, we certainly wouldn't require them to bring their own equipment.

Therefore, the work of industrial property management specialists is about ensuring that the government provides those resources that a contractor cannot, and further, that the contractors are good stewards of the resources provided. Federal agencies increasingly rely on hiring people to perform services—with the value of service contracts increasing 90 percent between 2000 and 2012, according to the Congressional Budget Office—making the job of ensuring equipment compliance for contractors even more important.

ESTABLISHING ACCOUNTABILITY

This work includes performing audits, also known as property management system analyses, to verify that contractors are complying with contractual, FAR and other federally mandated property accountability requirements; handling government property loss cases; and addressing other situations as they arise. When we find a computer, printer or device not in use, or when we find equipment being underused, for example, that equipment needs to be double-checked to be sure it's in the inventory and reassigned to where it can do the most good. At the core, all that means keeping track of Army property no matter who the user is—Soldier, DA civilian or contractor.

There are few people currently employed in the General Schedule industrial property management specialist series, in part because of its very specific requirements and the numerous certifications required to work at the highest levels. As a result, anyone whose work involves systems engineering and technical assistance, contractor support, test or range operations, logistics or maintenance, among other functions, often lacks a resource for addressing instances in which:

- Government and contractor personnel are unsure how to dispose of excess government property at the end of a contract's period of performance.
- A contractor is unable to account for government property in their possession.
- Government personnel are unsure whether they should provide a contractor the government property it is requesting.

HOW IT WORKS AT PEO IEW&S

This brings us back to PEO IEW&S's efforts to address its internal government property accountability. Maj. Gen. Kirk F. Vollmecke, the program executive officer, is acutely aware of the importance of the work that industrial property management specialists perform, both inside and outside of contracting organizations, and has expressed his enthusiasm and support for the work they do on numerous occasions. Since my arrival at PEO IEW&S from ACC-APG in January, he has joked that my supervisor, Clarissa Lane, should "lose" my temporary assignment paperwork so that PEO IEW&S can continue to receive "much-needed, dedicated support."

WHAT STAYS AND WHAT GOES?

Letterkenny Munitions Center in Pennsylvania completed the first phase of its supply chain optimization strategy earlier this year, upgrading inventory systems for its supply warehouse (shown before the upgrade) and increasing storage capacity by 60 percent. Other aspects of the strategy include increasing audit readiness, controlling inventory and reducing excess to decrease costs and increase readiness—in short, work tailor-made for an industrial property management specialist. (Photo by Natasia Kenosky, Letterkenny Munitions Center)

Here are some details of the work my assignment has allowed me to do:

- Write the government-furnished property sections of "Standard Operating Procedures for Property Accountability" for PEO IEW&S and the assistant secretary of the Army for acquisition, logistics and technology, to establish common practices within PEO IEW&S and the PEO community at large to account for government property provided to contractors.
- Conduct training for PEO IEW&S property accountability, contracting and other personnel to develop a common operating picture of how their joint efforts are required to establish and maintain accountability for government-furnished property.
- Write standard government property accountability-related language for use within the organization's performance work statements to ensure that contractors perform to and accurately report government property accountability practices. (See Figure 1, Page 50)

Even more important, I regularly meet with and directly support PEO IEW&S logisticians and others to address challenges they face in preparing for congressionally mandated Army audits. Further, I facilitate communication between PEO IEW&S offices and their servicing contracting centers to ensure that all parties are working together to overcome the obstacles that impact all of their operations. Over three months, we've identified outdated equipment (who needs a dot-matrix printer in 2017?), underused equipment and other unfulfilled contractor needs, and subsequently removed it from inventory, repurposed it to personnel who need the equipment and filed requests for changes.

CONCLUSION

You may not always see or feel the results of this work, since there are so few industrial property management specialists or government property administrators. Perhaps your office would benefit from having greater support from someone in my career field. Those who work directly with industrial property management specialists or who have had contract-related issues corrected by them often see a distinct benefit: Their operations consistently run more smoothly and efficiently because of the support of personnel who truly understand the challenges that can arise when working with contractors and government property on contracts. As congressionally mandated government property and other audits continue, that is all the more reason to advocate for the work that industrial property management specialists do to address issues that are not likely to go away on their own.

For more information on qualifying for credentials in industrial and contract property management, go to the Defense Acquisition University website ***http://icatalog.dau.mil/onlinecatalog/CareerLvl.aspx?lvl=1&cfld=5****, or the U.S. Office of Personnel Management website* ***https://www.opm.gov/policy-data-oversight/classification-qualifications/general-schedule-qualification-standards/1100/industrial-property-management-series-1103/****.*

MS. SABRINA JOHNS is an industrial property management specialist for ACC-APG. She holds an MBA with a concentration in information technology management from Southern New Hampshire University, and a B.A. in French and psychology from Lawrence University. She is Level II certified in industrial and contract property management and in life cycle logistics and Level I certified in program management. She is a member of the Army Acquisition Corps.

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MR. MATTHEW LAZZARO

COMMAND/ORGANIZATION:
U.S. Army Communications-Electronics Research, Development and Engineering Center, U.S. Army Research, Development and Engineering Command

TITLE: Chief, Cryptographic Modernization Branch

YEARS OF SERVICE IN WORKFORCE: 12

DAWIA CERTIFICATIONS:
Level III in engineering

EDUCATION:
M.S. in systems engineering, Stevens Institute of Technology; B.S. in electrical engineering, New Jersey Institute of Technology

AWARDS:
Army Acquisition Executive's Excellence in Leadership Science and Technology Professional of the Year; CERDEC Supervisor of the Quarter; Dr. William A. Novick Award

Strengthening the defense of Army data

As chief of the Cryptographic Modernization Branch of the U.S. Army Communications-Electronics Research, Development and Engineering Center (CERDEC), Matthew Lazzaro finds himself on a front line of a different sort. "In this age of increasing cyberattacks and penetration attempts on the U.S. government, encryption equipment is the first line of defense for protecting our nation's most critical infrastructure," he explained.

Lazzaro, whose branch is part of the Space and Terrestrial Communication Directorate, oversees 17 subject matter experts and 52 contractor engineers and engineering technicians, tasked with planning and directing programs involving cryptographic encryption devices integral to national security. He gets a lot of satisfaction from being part of the development cycle—"working in the same field and witnessing, as well as taking part in, the evolution of the Army network, from working legacy circuits that ran at 50 bits per second to backbone and encryptors reaching 100 gigabytes per second."

He said the most important points of his career "have been working the entire life cycle of various encryption products, from initial test and evaluation, to fielding support, to the evolution of the product through software updates, and finally removing the product from the field and replacing it with new technology."

The biggest challenge Lazzaro faces is part financial, part inability to forecast the future: "Budgeting and proposing solutions for gaps that we don't even know exist" is difficult, he said. "It's hard to predict gaps and propose solutions for those gaps years in advance. My engineers regularly speak with program managers and field users to better assess needs so we can attack those larger gaps."

His leadership of those efforts was among the reasons he received the award for the Army Acquisition Executive's Excellence in Leadership Science and Technology Professional of the Year in 2016. Lazzaro garnered recognition for CERDEC's support of the Project Management Office for Network Enablers (PMO Net E) within the Program Executive Office for Command, Control and Communications – Tactical. He was a key player in the Army-Wide Cryptographic Network Standardization (ACNS) initiative, led by PMO Net E, providing oversight, guidance and assistance to a team of engineers that modernized the entire Army inventory of cryptographic devices by replacing inactive ones with modern versions. He and his team removed nearly 5,400 legacy devices and installed more than 1,800 modern counterparts at 245 military bases worldwide.

The Army launched ACNS in 2012 to upgrade outmoded cryptographic devices and to standardize security capabilities for the Army's tactical network. The ACNS team has received several accolades for its work to ensure that U.S. troops have cryptographic capabilities that protect data and voice transmission from electronic attack, including CERDEC's Dr. William A. Novick Award for expediting technology to get it into the hands of Soldiers.

Lazzaro also was instrumental in CERDEC efforts to support the National Security Agency (NSA) Commercial Solutions for Classified (CSFC) Program, which provides a framework to reduce the logistical footprint and boost protection for transmitting and exchanging classified information. NSA created the program to facilitate the use of commercial products to protect classified national security systems information, and to bring cryptographic equipment into compliance with the agency's standards for upgraded data networks and cryptographic algorithms and keys.

Thanks in part to Lazzaro's contributions, CERDEC was the first DOD entity to earn the NSA certification of CSFC trusted system integrator. His lab has engineered or evaluated more than a dozen solutions that focus on reducing risk in the area of command, control, communications, computers, intelligence, surveillance and reconnaissance. In late 2015, the team provided a risk-reduction solution based on CSFC virtual private network capabilities for the Project Manager for Warfighter Information Network – Tactical. In just four weeks, it was able to engineer, integrate, test and validate the solution, which the Army successfully demonstrated at the Network Integration Evaluation 15.2 and has since integrated into future baselines for the project. Receiving the Science and Technology Professional of the Year award caught Lazzaro off guard. "I sometimes forget that what we do—test and evaluation, integration, getting products into the hands of Soldiers—is considered acquisition," he said. "Working at the forefront of protecting our nation's most critical infrastructure is very satisfying."

Lazzaro worked in the private sector for several years, in application engineering, motion-control system design, robotics and vision systems, before joining the Army Acquisition Workforce. "I worked on a broad range of industrial applications," he said, including for the U.S. Post Office, Benjamin Moore & Co. and Veeco Instruments Inc.'s semiconductor division. "Before that, I worked in fireplace design for many years."

He was approached by engineers he knew through college friends to work in the field of information assurance (IA). It "sounded interesting, and it was a field I had worked in before, indirectly. It was something new and different and, at the time, it was a career track that colleges were not offering." An opportunity arose to join CERDEC's IA Division, working in the Cryptographic Modernization Program Management Office. "In that position, I was able to apply my engineering degree, testing and evaluating security equipment used on the government network."

The switch from the private sector to the public required a shift in mindset. "The government has a lot of rules, but a lot more resources," he said. "In private industry, it was hard to get new technologies: We had to make do with what we had. In government, many resources are available, but there are a lot more acquisition and policy rules."

Being in acquisition sort of snuck up on him, but he's grateful to be part of the community. "As an engineer, I was looking to solve problems and work with new technology, and the positions I have held throughout my acquisition career have allowed me to do that."

To anyone seeking similar opportunities, Lazzaro had this advice: Get out and work in the field or in the operational environment. "Nothing helps you learn as fast as trying to solve real-world problems as they are happening and getting your hands dirty. Working in the lab only gets you so far."

—MS. SUSAN L. FOLLETT

A VERY COLLABORATIVE PROTOTYPE

The MML, mounted on a medium tactical truck, can rotate 360 degrees and elevate up to 90 degrees. It is the first major acquisition program developed by the government in more than 30 years. More than 150 subject matter experts across the AMRDEC enterprise—a subordinate command of RDECOM, and one of its six RD&E centers—representatives from five directorates and 85 industry partners worked together to design and manufacture it. (U.S. Army photo)

CHAMPION *for* TECHNOLOGY

Maj. Gen. Cedric T. Wins, RDECOM commanding general, answers questions about how RDECOM solves problems that Soldiers face today, as well as what the Army will face in the future.

by Ms. Argie Sarantinos-Perrin

For Maj. Gen. Cedric T. Wins, readiness is a moving target. The necessity for readiness today is simply a given, but then there's tomorrow and the host of tomorrows to come.

"We need to strike the right balance between near-term and far-term technology so that we can stay ahead of our adversaries. Our goal is to figure out how to capture breakthrough technology and harness its potential so that we keep the technology pipeline full," Wins said in an interview on July 7.

Wins is in a place to know. As commanding general of the U.S. Army Research, Development and Engineering Command (RDECOM), it's his job to oversee research and development efforts among a team of Army scientists and engineers that is engaged with hundreds of industry and academic partners around the world.

By serving as a bridge connecting the science and technology (S&T) community, the operational community and the acquisition community, Wins champions technology that will bring value to the Army and provide better capabilities.

A major subordinate command of the U.S. Army Materiel Command, Wins' team includes six research, development and engineering centers (RDECs) and the U.S. Army Research Laboratory, which work together to develop technologies and capabilities for Soldiers across all domains—land, air, sea, space and cyber.

Argie Sarantinos-Perrin: What does readiness mean to you?

Wins: Army Chief of Staff Gen. Mark A. Milley is on record saying we are on the cusp of a fundamental change in the character of ground warfare that

will be as significant as the introduction of the machine gun or the change from horse to mechanized vehicles. Importantly, he makes a distinction between the nature of war, which he says is immutable, and the character of war, which changes with our adversaries, the terrain and, in this case, the technologies we have and the technologies our Soldiers face.

As RDECOM commander, I have to make sure we are working on the capabilities our Soldiers need to dominate any adversary with respect to both the nature and the character of war. And we have to do that across the Army's primary time horizons—the current fight, the next fight and the future fight. We have to give Soldiers what they need to survive the nature of war and win within the character of the particular conflict they might face. The RDECOM team does that by working on programs to take the cognitive load off Soldiers so they can overcome the fog of war, which is part of its nature. At the same time, we're working on programs that gather data about the character of a particular situation that our Soldiers face for decision-makers.

Fundamentally, war is a series of actions and reactions. We make changes and our adversaries make moves and countermoves, and we discover second- and third-order effects. For example, the changes in the character of war—the speed of communications, movement, firepower, etc.—mean that decisions are being made at lower and lower levels. When I came in the Army, you had to find a platoon leader or a tactical operations center to find a radio. Now, every Soldier is increasingly becoming a node on the network, and, as a part of the multidomain battle, we expect a continuous, uninterrupted mission command with a robust and resilient network. That brings the obvious power and weight considerations, which we have to address.

That's the RD&E [research, development and engineering] part of the readiness picture. The more we can empower our Soldiers to dominate an adversary, unburden them of what is distracting or unnecessary and protect them from their adversaries, the better our Soldiers can defend our nation and its interests.

Sarantinos-Perrin: How do you see RDECOM shaping readiness for today and tomorrow?

Wins: A big part of working across these time horizons is keeping the technology pipeline full. We need to strike the right balance between near-term and far-term technology so that we can stay ahead of our adversaries. One way we do this is by working with industry to capture emerging technology and figure out how we can adapt it for military use. We also collaborate with industry to develop technology that has a military application and can also be used commercially. This collaboration, in my view, needs to occur early and often, minimizing barriers that sometimes occur when government and industry partners compete. Then, we need to make the technology available for our Soldiers as quickly as possible.

The Global Positioning System, or GPS, which was once a revolutionary product, is used around the world in cars, boats, planes, trains, smartphones and wristwatches. While our Soldiers rely on GPS to navigate, our adversaries have figured out how to jam the signals, and they are taking advantage of that. In order to stay ahead of our adversaries and keep the pipeline going, we are working on the successor to GPS by developing new algorithms and architectures that will provide stronger signals and plug-and-play integration across multiple platforms.

We often pursue long-term technology through our research efforts even though we do not know how it will be applied for the Army or how it will change the character of war. For instance, we are working on high-energy lasers, a technology that we have been working on for 16 years, which will affect the overall character of

KEEPING THE FUEL TANK AND TECH PIPELINE FULL

TARDEC and General Motors Co. worked together to develop the ZH2 hydrogen fuel-cell electric vehicle, an example of the state-of-the-art capacity RDECOM champions and evaluates for military use. TARDEC helped inform requirements for the new ZH2, which is currently being evaluated at various military bases around the country. (U.S. Army photo)

We are past the time in history when one part of RDECOM can develop a major capability without the help of some other part — or many other parts — of the command and our partners.

war by giving us a lethal capability, as well as a logistics capability, but we aren't really sure about its full potential or how it can be fully applied in a military setting. (See "Decades to 'ZAP,'" Page 149.)

We have to work the whole range of RD&E now if we want new technologies to build new capabilities for the future fight. If we stop working toward all of those horizons, gaps in capability will occur. Soldiers of the future will turn to us and we won't have what we need to create the capability they need. That's the day they walk into a fair fight, or perhaps when we're at a disadvantage. We can't let that happen.

Once we identify that need, we need people who can not only master the scientific and technological disciplines we know today, but who can also identify and pioneer the ones that have yet to emerge. And the same is true of the facilities and tools they'll need. With that talent, we have to provide the best environment in terms of labs, equipment and knowledge so they can perform.

Consequently, managing talent and infrastructure is a big focus of our internal campaign plan for this reason. Just as the Army realizes you need good trainers and good training facilities to make good Soldiers, we realize you need good scientists and engineers in world-class facilities to create world-class capabilities.

Sarantinos-Perrin: Speaking of the future, are there any research programs that you're especially excited about that may not be fielded for many years?

Wins: Quantum effects holds great promise for the future. For example, when we can make quantum communications work, we will be able to communicate without worrying about our messages being intercepted. That will potentially be a revolutionary shift from today, when we put so much time and effort into protecting the network. Of course, our competitors are working on this as well. What will it mean when both major parties of a conflict can communicate at the speed and in the volume we do today without worrying about their adversary intercepting their communications? What will that do to the rest of the battlefield? To signals intelligence? What will we have to give commanders to allow them to dominate that battlefield?

Artificial intelligence [AI] is another area where we are exploring the use of autonomous or semiautonomous technology to control combat. By using AI, there is the potential for the Army to engage the enemy at a greater distance and keep them off guard.

We are also looking at ways to better protect Soldiers in a multi-domain battle, which includes the cyber domain. All domains will be contested, so we have to be able to throw the enemy off by attacking from different domains, which will require more capacity and [more] lethal and resilient systems all around.

Soldiers will need to know which network will give them the right effect, which will more than likely not be the network that we have today. The future network will enable Soldiers to perform uninterrupted command in a contested environment—with the ability to scale down to a degraded mode, if necessary, then back up to a robust mode—and it will be self-healing, resilient and allow Soldiers to communicate over extended distances.

Sarantinos-Perrin: Can you walk us through the development of a recent prototype? What is it, how was it conceived, how was it developed and where is it going?

Wins: Our team at the U.S. Army Aviation and Missile Research, Development and Engineering Center [AMRDEC] created the Multi-Mission Launcher [MML] prototype, which is the first government development of a major acquisition program in more than 30 years. Truly a team effort, the MML was developed by more than 150 subject matter experts across the AMRDEC enterprise and representatives from five directorates and more than 20 functional areas, as well as 85 industry partners who assisted in designing and manufacturing.

The MML program is part of the Indirect Fire Protection Capability Increment 2 – Intercept [IFPC Inc 2-I] system, which is a mobile, ground-based weapon system designed to defeat unmanned aircraft systems, cruise missiles, rockets, artillery and mortars.

The project began in 2012 when the IFPC Inc 2-I product office approached AMRDEC to determine if an MML was feasible from an engineering standpoint. Working together, our AMRDEC engineers and the IFPC Inc 2-I product office moved the project forward, and two prototype MMLs were delivered in 2015.

WORKING ON THE HOVERBIKE

Wins learns about a prototype version of the Joint Tactical Aerial Resupply Vehicle (JTARV) from Sgt. 1st Class Daniel Guenther, an enlisted adviser at the U.S. Army Research Laboratory's Weapons and Materials Research Directorate, during a visit to Aberdeen Proving Ground, Maryland, in September 2016. Also known as the "hoverbike," the JTARV may one day enable Soldiers on the battlefield to order and receive supplies rapidly from an autonomous unmanned aerial vehicle. (U.S. Army photo by Conrad Johnson)

Another exciting prototype is a collaborative effort between the U.S. Army Tank Automotive Research, Development and Engineering Center [TARDEC] and General Motors—the new Chevrolet Colorado ZH2 hydrogen fuel-cell vehicle. The ZH2 is an off-road truck that was designed for the Army. The truck's hydrogen fuel can be produced from a variety of sources, including natural gas, and the vehicle does not produce any harmful emissions, only water. The ZH2 is currently being evaluated at various military bases around the country and offers other benefits, including less heat and noise, which is helpful in situations where stealth is required. TARDEC worked with industry early on in the process and helped inform requirements.

Sarantinos-Perrin: As the RDECOM commanding general, is it your call whether a particular technology goes forward? What goes into making such decisions?

Wins: This is a complicated question, because we work across different time horizons and support a wide variety of partners. I have the power to make decisions for any part of RDECOM, but I know it's best to trust the experts—the folks in the RDECs and labs who work hard to develop the technology. They're the best in the world.

Once we get a technology to the point where it can transition out of RDECOM to be used by someone else, the authority to accept that technology transitions as well. The technology transitions, as your readers know, to program managers and program executive officers whose goal is to make the technology a program of record, which means funding has been approved so the program can move forward. However, the final decision is made by the chief of staff of the Army and the Army acquisition executive.

What ultimately drives these decisions are the same realities that drive the rest of the Army—time, technology and resources. Most importantly, does it enhance the capability of the warfighter?

Sarantinos-Perrin: You've given examples of how RDECOM supports warfighters on the ground. How about Army aircraft?

Wins: One area most people don't know about is the role our RDECs play in flight safety and airworthiness of our military aircraft. RDECOM's Aviation and Missile Research, Development and Engineering Center inspects every Army aircraft for airworthiness. As part of maintaining aviation readiness in support of the Aviation and Missile Life Cycle Management Command, we are working on the Advanced Threat Detection System, which will protect the aircraft as well as personnel in them. That's a significant contribution to day-to-day readiness.

Looking more long-term, we can look at efforts in Degraded Visual Environment [DVE] and Future Vertical Lift [FVL]. The DVE effort combines several technologies to allow pilots to look into degraded environments such as storms or fog or obscurants and identify things like hidden structures, power lines, etc. Part of readiness is being able to operate in different environments, so DVE will make a significant readiness impact when it's fielded.

The FVL is expected to replace the Army's current aviation fleet over the next 25 to 40 years. AMRDEC is leading the DOD science and technology part of the project, and is working with industry to design and build a joint multirole

technology demonstrator, tentatively scheduled for delivery in 2018. A technology demonstrator is a pre-prototype that is built with existing capabilities as well as experimental capabilities, and it is constructed in such a way that future technologies can be incorporated into it. We are working side by side with industry and sharing our S&T efforts to help inform and deliver on FVL technology. Plans for the new FVL include the ability to fly farther and faster, carry heavier payloads, be easier and less expensive to sustain, team with unmanned systems and perform certain optionally piloted missions.

Sarantinos-Perrin: Soldiers rely on the Army's tactical network to communicate and maintain situational awareness, so maintaining cyber resilience is critical. What research and development projects is RDECOM working on that support cyber resilience?

Wins: While we typically think of electronic warfare in relation to radios and electronic systems, our team at TARDEC is developing cyber resilience in autonomous vehicles. TARDEC has completed the first trial and will conduct a second one this fall with Australia's Defence Science and Technology Group. This project, which began last fall, evaluated the cyber-resilience of an autonomously operated vehicle in Australia from TARDEC's labs in Warren, Michigan. Using a satellite-on-the-move system that was developed in Australia, data was transferred between a control station and the moving robotic vehicle. For the second phase this fall, the team will integrate a weapon system onto the vehicle to test its cyber vulnerabilities. (See "Nobody, Take the Wheel!" Army AL&T, April – June 2017.)

I mentioned earlier how the future network will have to bridge tactical technologies with commercial technologies, allowing Soldiers to go back and forth seamlessly. Our CERDEC [Communications-Electronics Research, Development and Engineering Center] team is working on hardware network convergence, which will allow Soldiers to operate in a denied environment and leverage communications from different tiers, including the ground, aerial and satellite layers. The ultimate goal is for a Soldier to use his radio to communicate, without worrying about which network he is using or whether he will be able to communicate at all.

Sarantinos-Perrin: How does your previous service in G-8 and force development inform your view of readiness and your work at RDECOM?

Wins: My previous work in G-8 and the Army Capabilities Integration Center gave me the opportunity to work the full range, from requirements to resources to technology development. I've worked on the requirements side as the director of capability development as part of the U.S. Army Training and Doctrine Command [TRADOC], where Army requirements are generally initiated. I was the first person to determine if a requirement was written in a way that would provide capability to the warfighter. From there, the requirement moved forward to the Department of the Army to be approved and matched with the appropriate resources. I learned to appreciate the process, which, of course, often came with funding challenges.

I am now on the front end of the material development side, looking at ways for the technology to be inserted into different capabilities that generally are intended to deliver a material solution. While each team has a different perspective on the technology, the bottom line is how it will meet the tenets of readiness, how it will provide a capability that empowers, unburdens and protects the warfighter.

Sarantinos-Perrin: Is there anything you would like to add?

Wins: Everything I've talked about today is largely possible because of the RDECOM workforce, a team of more than 14,000 people at more than 100 locations around the world. This talented team is responsible for developing and maturing technology that enables Soldiers to do their jobs and support their missions.

Key to all these efforts is integration. We are past the time in history when one part of RDECOM can develop a major capability without the help of some other part—or many other parts—of the command and our partners. We work closely with industry and academia, as well as with key Army organizations including TRADOC, the U.S. Army Aviation Center of Excellence, program executive offices, the acquisition community and Soldiers to identify science and technology requirements, manage research and testing, then pass the information to industry to develop.

For more information, go to the RDECOM website at ***http://www.rdecom.army.mil/*** *or contact the RDECOM Public Affairs office at 443-395-3922.*

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ELECTRONIC WARFARE FRONT

Mortarmen with the 2nd Brigade Combat Team, 101st Airborne Division conduct a live fire exercise during Network Integration Evaluation 17.2, held in July at Fort Bliss, Texas. The Army RCO is using the operational exercise to gain Soldier feedback on its electronic warfare prototypes. (U.S. Army photo by Sgt. Maricris C. McLane, 24th Press Camp Headquarters)

The POWER *of* PROTOTYPES

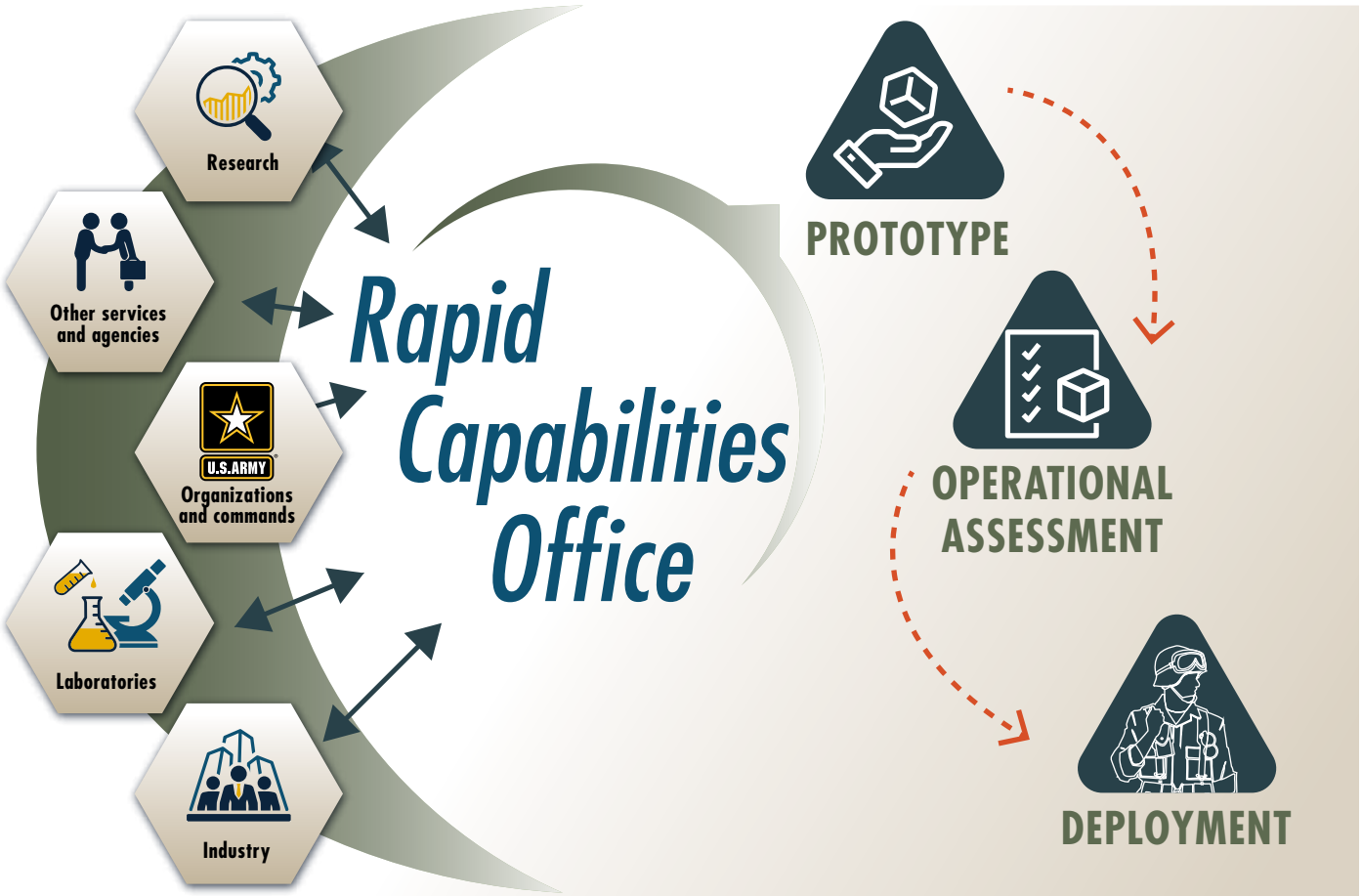
One year on, the Army Rapid Capabilities Office is breaking the 'one-size-fits-all' acquisition approach to combating rising threats.

by Lt. Col. Marcos A. Cervantes

Last August, senior Army leaders unveiled a new secret weapon. But it wasn't a missile or a radar or a tank. It was the Army Rapid Capabilities Office (RCO), a new organization designed to cut through the bureaucracy and rapidly deploy technologies to combatant commanders in order to address high-priority strategic threats.

The office's mandate, said Gen. Mark A. Milley, the Army chief of staff, was "to ensure that we're pursuing the right capabilities for our Army today and tomorrow, and to do it very quickly, and to cut through the red tape with a direct line to the secretary [of the Army] and myself—with no hurdles to jump and no bureaucracy to get lost in."

A year later, the RCO has followed through by deploying the Army's newest rapid prototype, which brings new defensive and offensive electronic warfare capabilities to the tactical level. Soldiers in the forests of Europe and the deserts of southwest Texas have evaluated the first phase of the RCO's electronic warfare efforts, which combine multiple existing systems from the Army's inventory with emerging technologies to enable ground maneuver in contested



INDEPENDENT BUT INTERDEPENDENT

Much of RCO's success hinges on its organizational structure, designed so that it's able to respond quickly as new threats emerge. But agile doesn't mean alone: RCO works with a variety of entities—including Army organizations, PEOs, defense contractors, small businesses and academicians—to prototype, test and field promising capabilities. (Graphic by the U.S. Army Acquisition Support Center)

electromagnetic environments. As the RCO's first project, the electronic warfare capability is also setting a precedent for incremental and rapid integration of prototypes for operational assessment and deployment.

BRIDGE TO THE FUTURE FORCE

While the RCO continues to evolve, it's making the progress that Milley and other senior leaders envisioned. Formed as a direct pipeline for senior leaders to address combatant commanders' strategic-level gaps against near-peer threats, the RCO serves as a bridge to enduring Army programs by fielding a "good enough" solution that meets a critical need now, and continuously adding new technology as the state of the art progresses.

The RCO's one- to five-year time frame for equipment delivery fits between the Army's Rapid Equipping Force, which has the task of delivering commercial off-the-shelf items to deployed company-level units in less than two years—usually in 180 days or less—and traditional programs of record, which often take many years to field and are intended to provide enduring equipment for the entire force. The RCO is also focused on providing combatant commanders decisive capabilities in contested environments, with the initial focus areas of cyber, electronic

RCO is proving, through the power of prototypes, to be a change agent for addressing strategic-level urgent and evolving threats while informing the Army's long-term modernization approach.

warfare, robotics, counter-unmanned aerial systems (UAS), and positioning, navigation and timing (PNT).

The power behind the RCO is the direct involvement of the secretary of the Army, the chief of staff of the Army and the Army acquisition executive, who together make up a board of directors that makes decisions on RCO projects. The RCO also incorporates direct feedback from combatant commanders and collaboration across the acquisition and operational communities into its operating model.

The advantage of using integrated prototypes that cross portfolios is that it enables the Army to respond quickly as new threats emerge, tailoring its tactics for each project. The RCO can also fail quickly, not being locked into traditional constraints found with programs of record. Instead, a prototype serves as a working model. Over time, that model is shaped into something that could become an official long-term program of record, or it could be scrapped if the capability doesn't pan out or the threat changes.

Beyond responding to current gaps, the RCO is partnered with the U.S. Special Operations Command (USSOCOM), DOD's Strategic Capabilities Office, the Defense Innovation Unit Experimental, the Defense Advanced Research Projects Agency and others. By participating in their efforts and making small investments in a portfolio of promising technologies such as artificial intelligence and swarming drones, the RCO can help the Army prevent future capability gaps and even achieve overmatch. Being part of this rapid innovation ecosystem allows the Army to insert technology from proven sources into the Army formations that need them most.

RAPID TAKEOFF

Even before the office's formal announcement in August 2016, the RCO was taking shape. Behind the scenes, the Army filled key leadership roles by pairing a civilian acquisition expert with a uniformed operational expert. Douglas K. Wiltsie, director of the System of Systems Engineering and Integration Directorate within the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology and a former program executive officer, became the RCO director. Maj. Gen. Walter E. Piatt, the director of operations in the HQDA G-3/5/7, became the RCO director of operations.

Wiltsie brought significant acquisition and technical expertise based on his tenure in the Program Executive Office

LINE OF EFFORT

Military forces from the U.S., U.K., Lithuania and Poland conduct a convoy movement from Poland to Lithuania during Saber Strike 2017. A multinational combined forces exercise, Saber Strike is conducted annually to enhance the NATO alliance throughout the Baltic region and Poland. The exercise was led by U.S. Army Europe, from whose operational needs the RCO developed its first prototypes. (U.S. Army photo by Spc. Stefan English, 55th Combat Camera)

(PEO) for Enterprise Information Systems and the PEO for Intelligence, Electronic Warfare and Sensors (IEW&S). Piatt contributed decades of operational experience based on numerous commands and deployments—including a recent tour as the deputy commanding general for U.S. Army Europe (ground zero for the need to deter near-peer threats).

With leadership in place, work began immediately. Senior leaders and Army staff prioritized operational needs statements (ONS) from the field, and the board of directors directed the RCO to address an ONS from U.S. Army Europe seeking electronic warfare capabilities. The RCO partnered with the Program Manager for Electronic Warfare and Cyber (PM EW&C) within PEO IEW&S—and the Army's broader electronic warfare, signals intelligence and cyber community—to sketch out a prototype concept and a corresponding timeline to rapidly integrate, assess and deploy the technology. The goal of the project was to provide units on the front lines in Europe something that didn't exist in the Army inventory, but that they would need in any future conflict: an integrated electronic warfare capability for electronic detection, support and attack in contested environments. The capability would enable Soldiers to detect, identify and engage hostile emitters in the electromagnetic spectrum without being hobbled by enemy interference.

MOVING PROTOTYPES TO THE FIELD

After traveling to Europe to meet with the units requesting the technology and ensuring that the RCO's proposal would meet their needs, it was time to get to work. Working side by side with PM EW&C, electronic warfare officers, Army headquarters staff, the U.S. Army Training and Doctrine Command, the U.S. Army Test and Evaluation Command and others, the RCO condensed the acquisition process and brought its players closer together in order to get immediate results. The RCO maintained continuous dialogue with the field while advancing the electronic warfare systems through laboratory development and integration.

In the spring and summer of 2017, the systems participated in Network Integration Evaluation 17.2 at Fort Bliss, Texas, and in operational assessments in Europe that included Exercise Saber Junction and Exercise Saber Guardian. Soldiers provided constructive feedback on numerous aspects of the prototype—from the weight of the dismounted components that can find and attack enemy signals of interest, to the user interface of the mission command system that displays a common operating picture for the electromagnetic spectrum.

Their feedback was not limited to the system itself: It also focused on critical implementation factors such as tactics, training and manning (e.g., whether additional electronic warfare officers are needed at various echelons). These tryouts led to improvements in advance of final assessments that are ongoing this

DEFENSIVE CYBER OPERATIONS

A Soldier from the 780th Military Intelligence Brigade sets up cyber tools at the National Training Center (NTC) at Fort Irwin, California in May. The 780th participated in the NTC training rotation for the 2nd Armored Brigade Combat Team, 1st Infantry Division as part of the Cyber-Electromagnetic Activities Support to Corps and Below initiative led by U.S. Army Cyber Command (ARCYBER). The Army is delivering a variety of prototypes for defensive cyberspace operations, focused on both the infrastructure and the tools needed to defend against attacks on Army systems and networks. (U.S. Army photo by Bill Roche, ARCYBER)

fall, with the goal of limited deployment to Europe beginning early in 2018.

While this first phase of electronic warfare capability is not expected to be a perfect, enduring solution fielded to the entire Army, it will close a high-risk gap against a rapidly modernizing adversary until official programs of record arrive with more mature technology. It also is informing the programs of record, as PM EW&C can adjust plans and reduce risk based on Soldier feedback from the RCO interim solution.

FULL SPEED AHEAD

At the same time as the RCO is deploying this electronic warfare capability to select units, it will also move forward to address other gaps and operational needs.

In its first year, the RCO started a PNT project that aims to enable ground maneuver in GPS-denied environments so that Soldiers can operate safely and successfully despite enemy jamming attempts. Working with the PNT community, the RCO identified viable technologies and accelerated their prototyping and integration. Initially these prototypes will be placed in priority combat vehicles while serving as a proof of concept for additional combat and combat support vehicles. An initial operational assessment of the capability is planned for the spring of 2018.

The RCO is also helping to shepherd and shape other Army urgent prototyping projects. Led by the Fires Center of Excellence at Fort Sill, Oklahoma, the Army delivered two prototype vehicles to Europe in March 2017. Known as the Counter-UAS (C-UAS) Mobile Integrated Capability, or CMIC, the system consists of Strykers integrated with advanced electronic capabilities to allow tactical units to detect, identify and defeat UAS through multiple different effects. This summer, through partners that included HQDA G-3/5/7, the U.S. Army Tank Automotive Research, Development and Engineering Center and the U.S. Army Communications-Electronic Research, Development and Engineering Center, a prototype system made its debut in Exercise Saber Strike. Known as the Remote Reconnaissance Vehicle Version 2 (R2V2), the unmanned ground and aerial capability can travel to areas where Soldiers can't in order to collect information that provides real-time situational awareness of the electromagnetic spectrum. The RCO is supporting CMIC and R2V2 as part of ongoing electronic warfare efforts.

The RCO also continues to move forward as the Army looks to fill other crucial gaps that apply across various regions and threats. These areas include cyber, artificial intelligence, long-range precision fires and high-energy lasers. The RCO is already partnering with USSOCOM and the Strategic Capabilities Office to advance swarm and anti-swarm capabilities through ThunderDrone, a two-month rapid prototyping event focused on drones, tactical swarms and their effects, culminating in a September 2017 demonstration of select systems.

At the same time the RCO is delivering prototypes, its Emerging Technologies Office (ETO) is forging ahead in outreach to everyone from traditional defense contractors to consortiums, small businesses, universities and others to identify the most promising technology. The ETO is looking at flexible and rapid industry engagement mechanisms and has established an open-door policy, both in person and through a secure web portal, to identify current gaps and match them with technology trends. The ETO has also partnered with the intelligence community and is poised to transition several disruptive technologies.

CONCLUSION

One year into its existence, the RCO is proving, through the power of prototypes, to be a change agent for addressing strategic-level urgent and evolving threats while informing the Army's long-term modernization approach. In doing what it set out to do during its initial year, the RCO established a precedent in prototyping at a pace that is relevant to meet immediate demands and close strategic gaps.

Operating on a small scale, taking technology risks that larger programs can't and finding interim solutions that help inform long-term programs, the RCO is playing a critical role in ensuring that the Army is ready to meet real-time demands today through the power of prototyping and is prepared for unknown demands tomorrow.

For more information, visit ***http://rapidcapabilitiesoffice.army.mil/****.*

LT. COL. MARCOS A. CERVANTES served as the deputy director for acquisition for RCO from August 2016 through August 2017, when he was selected as acquisition adviser to the undersecretary of the Army. As one of RCO's first and founding employees, he helped build the mission, culture, operations and accomplishments during its first year. Cervantes holds an MBA in systems acquisition management from the Naval Postgraduate School and a B.S. in business administration from The Citadel. He is Level III certified in program management and is a member of the Army Acquisition Corps.

NAVIGATING THE PATH AHEAD

A traumatic brain injury patient walks through a virtual reality scenario at the Computer Assisted Rehabilitation Environment Laboratory at the National Intrepid Center of Excellence in Bethesda, Maryland, in March. Cameras track the patient's movements and supply data to physical therapists. Similar approaches seeking to optimize treatment are being explored through the White House Precision Medicine Initiative, which aims to provide clinicians with new tools for treatment selection, taking into account differing symptoms, environments and lifestyles. (U.S. Air Force photo by J.M. Eddins Jr.)

ON THE FRONT LINES AGAINST PTSD

USAMRMC leads the way in research to prevent, diagnose and treat service members' psychological injuries.

by Col. Dennis McGurk, Lt. Cmdr. Christopher Steele, Capt. Leonard D. Skipper, Dr. Ronda Renosky and Dr. Ronald L. Hoover

Post-traumatic stress disorder (PTSD) has been called one of the "signature wounds" of the wars in Iraq and Afghanistan. The U.S. Army Medical Research and Materiel Command (USAMRMC) has been at the forefront of documenting the prevalence and impact of PTSD on Soldiers and the joint warfighter, and developing interventions to prevent or address it.

USAMRMC is the Army's medical materiel developer, with responsibility for research, development and acquisition and medical logistics management. In 2004, researchers from the Walter Reed Army Institute of Research (WRAIR), a subcommand of USAMRMC, published a study in the New England Journal of Medicine indicating that roughly 20 percent of Soldiers in several brigade combat teams (BCTs) met screening criteria for symptoms consistent with PTSD following deployment to Iraq and Afghanistan. A 2010 study showed that 24 percent of Soldiers in a different BCT met screening criteria for PTSD 12 months after returning from a combat deployment to Iraq.

These and other studies, in addition to continued tracking by the Armed Forces Health Surveillance Branch of the Defense Health Agency's Public Health Division, show that the impact of PTSD continues to be a strain on our Soldiers, more than 35 years after the American Psychiatric Association officially recognized PTSD in the third edition of its Diagnostic and Statistical Manual of Mental Disorders, published in 1980.

READY FOR THE NEXT MISSION

Airman 1st Class Alexandra Powell, a security member assigned to the 455th Expeditionary Security Forces Squadron, scans an airfield for potential threats on Camp Shorabak, Afghanistan, in March 2016. With studies indicating that a sizable percentage of warfighters are returning from deployments in Afghanistan and Iraq with PTSD, USAMRMC is working on new approaches to ensure that service members get the diagnosis and treatment they need and can return to duty with confidence. (U.S. Air Force photo by Tech. Sgt. Robert Cloys)

In addition to the human cost that PTSD extracts from those who suffer from it, many Soldiers who have PTSD are unable to do their military jobs and either leave service voluntarily or are medically retired. Gen. Mark A. Milley, chief of staff of the Army, has been clear that operational units must focus on readiness as their No. 1 priority. The loss of trained, combat-experienced Soldiers directly impacts unit readiness and puts greater pressure on the Army to rapidly train new Soldiers.

USAMRMC and its subordinate units continue to conduct research to mitigate service members' risk of and vulnerability to traumatic exposures that can cause PTSD. Additionally, extensive research focuses on developing rapid diagnostic procedures and tools, and on ensuring that care providers are armed with evidence-based treatment to facilitate recovery and fully prepare service members to return to duty with confidence in their ability to perform effectively.

Within the command, the Military Operational Medicine Research Program (MOMRP) is responsible for developing effective medical countermeasures against operational stressors and for preventing physical and psychological injuries during training and operations in order to maximize the health, readiness and performance of service members and their families. The MOMRP manages Army Medicine and Defense Health Program funding that supports the planning, programming and budgeting of psychological and behavioral health research.

MOMRP actively collaborates with the U.S. Department of Veterans Affairs (VA) and the National Institute for Mental Health (NIMH) as part of the National Research Action Plan. The national plan is a coordinated, multiagency response to the 2012 White House call for increased access to behavioral health care for veterans, service members and military families. All three agencies serve the same population, although usually at different times during and after their military service or affiliation.

In response to precipitously increasing numbers of behavioral health issues among service members, Congress initiated significant increases in research funding in 2007. Since then, MOMRP has managed more than $500 million and funded more than 300 projects to better understand PTSD and to help prevent and treat it. MOMRP also plays an integral role in developing and supporting implementation of PTSD care across the military health system, in VA hospitals and in community behavioral health care facilities that treat service members and veterans.

SUPPORTING PSYCHOLOGICAL HEALTH

MOMRP has four major areas of emphasis on Soldiers' and veterans' psychological health that affect readiness directly:

1. **Promoting the psychological adaptability of service members in the face of operational demands by improving their resilience, which in turn promotes readiness.**

   Research in this area includes the development and testing of training methods that enhance resilience. Examples include developing empowerment skills that build on inherent psychological strengths, training approaches that leverage leadership for better learning, and small-group cohesion building. Training in mindfulness

and biofeedback skills can also improve awareness of and control over physiological and cognitive processes, as these skills help regulate emotions and general distress and make it easier to adapt to situational stressors.

In 2009, WRAIR tested a one-hour post-deployment training session that focused on improving psychological resilience by harnessing service members' inherent abilities. Specifically, the training aimed to teach Soldiers to recognize and anticipate normal reactions to stressful circumstances and to manage those reactions effectively in training, operations, combat and when transitioning from deployment to home. In three group-randomized trials, the WRAIR team demonstrated that the training improved behavioral health. The researchers found that units completing this interactive resilience training within one week of returning from deployment showed greater readiness to conduct their mission 12 months later, in comparison with units that received only education about human stress responses and ways to address those responses.

2. Developing objective tools to assist in the diagnosis of PTSD.

Current diagnostic methods for PTSD rely on patients' own reports of symptoms. Symptoms often vary greatly from one patient to the next, and the subjective nature of self-reporting can complicate behavioral health providers' evaluations. Additionally, other factors can influence patients' self-reports, including concerns about PTSD carrying a stigma that could affect their career progression, potential medical discharge and longer-term disability status.

One of MOMRP's major current efforts focuses on developing a blood-based laboratory test that behavioral health professionals can use to aid in PTSD diagnosis so as not to rely solely on subjective self-reporting of symptoms. The goal is to have an objective platform, consisting of a biomarker assay and blood analyzer that can easily identify markers of illness from blood components, such as metabolic proteins, genetic markers and common biometric data. This screening tool will be used in military medical treatment facilities. Later uses will be to assess the trajectory of disease, PTSD subtypes, treatment matching and optimization, and response to treatment.

These advances fit well with the White House Precision Medicine Initiative launched in 2015. They also aim to accelerate biomedical discoveries and provide clinicians with new tools and therapies to select treatments, taking into account individual differences in genes, symptoms, environments and lifestyles. Within five to 10 years, when trials validate the blood-based PTSD test and it comes into common use by DOD behavioral health providers, the test will bolster readiness by ensuring that those who have PTSD are identified early, receive the best treatment and return to duty with confidence that they are psychologically ready for their missions.

3. Improving treatment of PTSD.

Two main evidence-based psychotherapies are currently in use across the military health system. The first is prolonged

A HEALING KINSHIP

Retired Command Sgt. Maj. Sam Rhodes, diagnosed with PTSD after serving 30 straight months deployed to Iraq, discovered that horses helped him regroup. Now he runs a nonprofit organization, Warrior Outreach Ranch, which helps veterans and their families reconnect and relax by learning to work with horses. In the search for effective treatments for PTSD in its many manifestations, MOMRP funds some studies that use complementary and alternative medicine approaches. (U.S. Army Reserve Photo by Maj. Michelle Lunato, 98th Training Division)

exposure (PE) therapy, which gradually exposes an individual to varying trauma-related sensory cues within a safe environment to reduce the intensity of emotional and physiological activation and arousal associated with the traumatic events. The second is cognitive processing therapy (CPT), which focuses on processing memories of traumatic events but without targeted exposure to trauma-related cues.

Both therapies have been used extensively and have been shown to be effective in civilian populations. MOMRP's research into the use of PE and CPT in treating military populations found that both therapies were effective but less so than for civilians.

One challenge of PE therapy is that the standard treatment protocol is 15 weekly 90-minute sessions. It can be very challenging for service members to complete the entire protocol because of job and family obligations, as well as deployments and permanent change-of-station requirements. To address the challenge of lengthy treatment protocols, MOMRP funded a study that demonstrated that three weeks of daily PE, for 90 minutes each day, was as effective as 15 weekly sessions, dramatically shortening recovery time.

There is also room for improvement in medications for PTSD. There are only two approved by the U.S. Food and Drug Administration for treatment of PTSD, and neither has been evaluated for its efficacy in treating service members. Both medications were developed to treat depression, are less than 50 percent effective in reducing symptoms of PTSD and have side effects, such as sexual dysfunction, that often cause service members to reject taking them.

NEW PATHS FOR PTSD TREATMENT

Col. Dennis McGurk welcomes attendees to the first Post-Traumatic Stress Disorder State of the Science Summit in Shepherdstown, West Virginia, June 13. The two-day meeting brought together experts to investigate new and current avenues in drug development to fight PTSD and related problems. Only two drugs are FDA-approved to treat PTSD, but their effectiveness is limited and their side effects often result in patients opting not to take the medication. (Photo by Crystal Maynard, U.S. Army Medical Materiel Development Activity Public Affairs)

To address the paucity of approved PTSD medications, USAMRMC hosted a state-of-the-science meeting in June in Shepherdstown, West Virginia. About 130 military leaders, academicians, researchers and pharmaceutical industry representatives from the fields of psychiatry, psychology, neurobiology, biochemistry and the development of psychiatric medication met to discuss the pathophysiology of PTSD, with the goal of identifying new targets for therapeutic medications. Findings included identifying and prioritizing research into seven candidate drugs or compounds to treat PTSD.

MOMRP also funds studies that use complementary and alternative medicine approaches to treat PTSD, including meditation, yoga, exercise, acupuncture and canine-assisted therapy. In most cases, the interventions would be used in conjunction with trauma-focused psychotherapy. If these additional efforts prove effective, many combat-experienced warfighters will be able to return to their units, and ultimately readiness will improve.

4. **Increasing access to and use of behavioral health care by reducing the stigma associated with PTSD and, more broadly, behavioral health care. Additionally, alternative forms of behavioral health care delivery are under evaluation through multiple research projects addressing the use of telemedicine, mobile applications and the internet.**

Research is underway on the development of new methods for training behavioral health providers in the use of evidence-based interventions, with a focus on web-based learning modalities. One promising finding indicates that tele-behavioral health approaches,

such as remote patient monitoring and mobile health platforms (for example, laptops, smartphone apps, tablets, etc.) appear to be as effective as in-person treatment. These methods offer alternatives where traditional mental health care is not easy to obtain, such as in rural areas, and are less likely to pose a stigma for some individuals, which makes it more likely that they will seek treatment.

The ultimate goal of this line of research is to determine the optimal methods and modes of delivering care by providing access to evidence-based clinical treatments that service members will be more likely to accept and use.

CONCLUSION

These efforts will directly improve readiness across DOD. In addition, the research will advance the science and clinical care of other populations of civilian trauma survivors, including those with occupational risk, those impacted by natural disasters and catastrophic accidents, and those who suffer severe trauma in the course of everyday living.

For more information, please visit the MOMRP website at ***https://momrp.amedd.army.mil****.*

COL. DENNIS MCGURK is director of MOMRP at USAMRMC, Fort Detrick, Maryland. He holds a Ph.D. in experimental psychology from Texas Tech University. He was a distinguished military graduate in his ROTC class at Loyola College in Maryland while earning an M.S. in clinical psychology, and he holds a B.S. in psychology from the University of Delaware. He entered the military in 1990 as an infantryman in the U.S. Army Reserve and was commissioned as a Medical Service Corps officer in 1994. He has served as a platoon leader, operations officer, company commander, research branch chief and detachment commander and has deployed to Haiti, Kosovo, Iraq and Afghanistan. He is Level III certified in science and technology (S&T) management.

LT. CMDR. CHRISTOPHER STEELE is deputy director of MOMRP. He received a Ph.D. from North Carolina State University in 2005 and accepted a commission as a U.S. Navy officer. He holds a B.S. in biology from King University. He served three years in the U.S. Army as an artilleryman and 12 years in the Army National Guard, serving in aviation, armor and engineering units as a noncommissioned officer in nuclear, biological and chemical operations and military intelligence. He has deployed to Iraq and Afghanistan. He is Level III certified in S&T management and Level I certified in program management, and is a member of the Navy Acquisition Corps.

CAPT. LEONARD D. SKIPPER is MOMRP's deputy director for advanced development. He holds a Ph.D. in psychology from Capella University, an M.S. in human relations from the University of Oklahoma and a B.S. in psychology from the University of Maryland University College. After enlisting and receiving an honorable discharge from the U.S. Air Force, Skipper transitioned to the U.S. Army under the Blue to Green Program. As a member of the Medical Service Corps, he served as a research psychologist at WRAIR and as a medical product manager at the U.S. Army Medical Materiel Development Activity. He is Level III certified in program management, Level II certified in S&T management and Level I certified in information technology.

DR. RONDA RENOSKY is the deputy portfolio manager of the Psychiatry and Clinical Psychology Disorders Portfolio at MOMRP. She holds a Ph.D. in biobehavioral health and an M.Ed. in rehabilitation counseling from The Pennsylvania State University. She completed a rehabilitation psychology traineeship at Johns Hopkins University's Welch Center for Prevention, Epidemiology and Clinical Research and Johns Hopkins Hospital's comprehensive rehabilitation unit.

DR. RONALD L. HOOVER is the clinical and psychological health portfolio manager within MOMRP. A licensed clinical psychologist, he holds a Ph.D. in clinical psychology from the University of Cincinnati and a B.A. in biology from Wittenberg University. He is a retired captain from the Naval Reserve Intelligence Program.

To address the challenge of lengthy treatment protocols, MOMRP funded a study that demonstrated that three weeks of daily [prolonged exposure therapy], for 90 minutes each day, was as effective as 15 weekly sessions, dramatically shortening recovery time.

PREPARATION SAVES LIVES

Pfc. Kaiya Capuchino, USAMRIID combat medic, takes part in USAMRIID efforts to train service members and civilians to defend against infectious diseases. DOD's Chemical and Biological Defense Program has spearheaded research to develop vaccines, drugs, diagnostics and information that will protect military service members from biological threats. The 2014-16 Ebola outbreak showed that this preparation—and the funding and research behind it—pays off in lives saved, and that these medical countermeasures can also be effective during a naturally occurring outbreak among civilians. (Photo by Air Force Staff Sgt. Chris Hubenthal, Joint Base Charleston Public Affairs Office)

A Test of MEDICAL Readiness

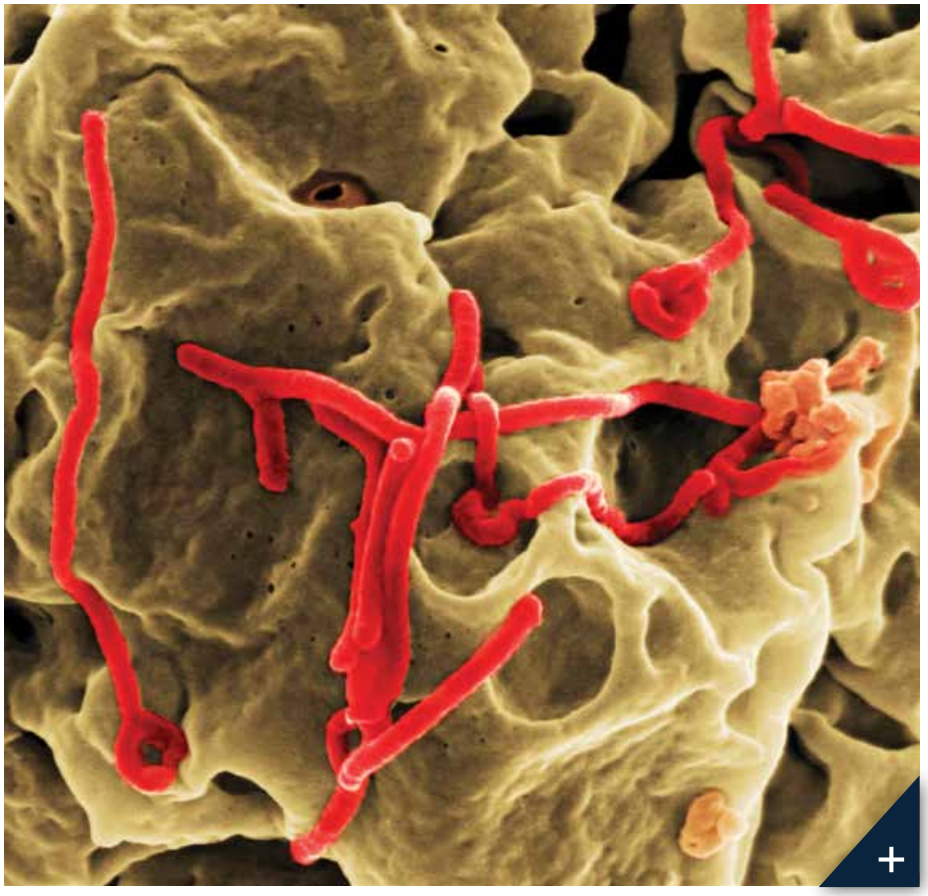
U.S. military efforts in biological warfare defense preparations prove themselves with Ebola response.

by Dr. George W. Christopher, Lt. Col., USAF, MC (Ret.)

The 2014-16 outbreak of Ebola virus disease triggered an unprecedented public health disaster. For the first time since its discovery in 1976, Ebola struck large, crowded and mobile urban populations. It was the largest Ebola outbreak in both numbers of cases and geographic distribution, with more than 28,000 cases, 11,000 deaths and 10 times the number of all previous Ebola outbreaks combined. The virus spread rapidly through Guinea, Liberia and Sierra Leone, striking Mali, Nigeria, Senegal, Spain, the United Kingdom and the United States as well. In the public health crises over past 100 years, only the 1918 influenza pandemic, the emergence of the human immunodeficiency virus and AIDS in the 1980s and the recent surge in antibiotic-resistant bacterial infections had greater impacts than Ebola.

Coordinated actions are what ended the Ebola outbreak. The total numbers of cases and deaths ultimately were far below initial projections, in large part because of the use of medical products originally developed by DOD to counter biological warfare threats.

Several lessons can be drawn from this experience to better prepare for future outbreaks. For one, products for biological warfare defense can be used for naturally occurring epidemics. For another, partnerships with other federal, private sector and host-nation stakeholders were key. Nevertheless, DOD's investment to develop medical products for rare but lethal diseases like Ebola was critical. In addition, the response to the Ebola outbreak underscores the difficulty of conducting clinical research during an epidemic and the corresponding need to proactively stage clinical trial sites.



THE EBOLA VIRUS

An electron micrograph shows Ebola virus, in red, emerging from infected cells. As a highly contagious viral disease with an average fatality rate of 50 percent, Ebola poses a possible biological warfare threat. DOD has spent more than a decade developing a variety of vaccines, tests and treatments to counter this threat. (Photo courtesy of National Institute of Allergy and Infectious Diseases)

LITTLE NOTICE BEFORE 2014

Because Ebola is a biological warfare threat, DOD's biological defense program has been developing medical countermeasures for over a decade. As a result, DOD has a portfolio of products and capabilities, unmatched by any other organization in the world, to counter a historically rare tropical disease that, before the 2014-16 outbreak, had received little in the way of financial investments from civilian investors, or privately funded efforts for medical countermeasure development by the pharmaceutical industry.

An organization within DOD's Joint Program Executive Office for Chemical and Biological Defense, called the Joint Project Manager for Medical Countermeasure Systems (JPM-MCS), gave crucial support to the U.S. government and international responses to the Ebola outbreak. DOD sponsored the development of vaccines, diagnostic tests and treatments against the Ebola virus as part of its program to counter biological weapons. Thus, DOD was positioned to offer vaccines, diagnostic tests and treatments that only a biological defense program would generate.

The first step in responding to a biological attack—or a naturally occurring epidemic—is to identify the cause. JPM-MCS provided the diagnostic test that confirmed the first cases of Ebola in Sierra Leone, and provided test kits that enabled DOD personnel in seven mobile laboratories to process 4,709 samples during 2014 and 2015. The U.S. Food and Drug Administration (FDA) granted emergency use authorizations to two diagnostic tests that JPM-MCS sponsored for Ebola: EZ-1 and BT-E. EZ-1 was used in Africa, the Ebola treatment centers in the United States and at the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID).

In 2014, kits to run more than 20,000 patient tests were placed in DOD medical treatment facilities and the U.S. Centers for Disease Control and Prevention (CDC) Laboratory Response Network. BT-E, as part of JPM-MCS's Next Generation Diagnostic Systems Increment 1, runs on a device used daily in the clinical labs of military and civilian hospitals to diagnose common infections. It is ready for use at USAMRIID and 16 DOD medical facilities. The EZ-1 inventory available at DOD medical treatment facilities is being phased out by BT-E, which received full FDA clearance for clinical use in February 2017.

VACCINES, READY TO GO

The approach of choice for any disease is prevention. For more than 10 years, JPM-MCS has partnered with the Defense Threat Reduction Agency's Joint Science and Technology Office (JSTO), the Walter Reed Army Institute of Research,

the U.S. Department of Health and Human Services (HHS), the department's National Institute for Allergy and Infectious Diseases and its Biomedical Advanced Research and Development Authority (BARDA) and other stakeholders to deliver an Ebola vaccine candidate as an accelerated offshoot of a long-standing project to produce a vaccine to counter three biological warfare threats. (The other two are the Sudan and Marburg viruses.) Thanks to 50,000 vaccine doses provided by JPM-MCS, this candidate entered clinical trials in West Africa to evaluate its ability to protect caregivers, case contacts and others at risk, and conferred 100 percent protection 10 or more days after vaccination.

In addition to providing a vaccine candidate to prevent illness, JPM-MCS and JSTO immediately offered three potential therapies to treat patients with the disease, each with unique mechanisms of action.

Favipiravir is a small molecule that inhibits a viral enzyme; TKM silences viral genes; and ZMapp neutralizes the virus through an antibody-mediated action. Favipiravir, TKM-Ebola and ZMapp were used on an emergency basis to treat patients evacuated to the United States and Europe. Favipiravir and TKM-Ebola also were evaluated in Africa by commercial sponsors in collaboration with European and host-nation agencies.

However, clinical trials did not confirm the potential suggested by animal testing, perhaps in part because of study design and the severity of disease in patients enrolled in the studies. A U.S. government-sponsored trial of ZMapp gave promising results, but because the study began late in the epidemic, only a small number of patients could be enrolled, limiting the conclusions that could be made. This study is ongoing, along with other studies to identify an Ebola treatment.

Moreover, JPM-MCS plays a key role in operational response. Efforts include collaborations with USAMRIID, HHS and the World Health Organization (WHO) to enhance the quality of medical care in developing countries, to prioritize vaccines and therapies for clinical trials, and to establish clinical trial sites in Africa. (See related article, "Identify. Quantify. Eliminate." Page 96.)

The total numbers of cases and deaths ultimately were far below initial projections, in large part because of the use of medical products originally developed by DOD.

Because conducting clinical studies during outbreaks is extremely difficult, an optimal approach would integrate research into outbreak response and would establish teams of host-nation researchers. This approach would designate clinical trial sites and establish study protocols that have clearance from the FDA and host-nation regulatory authorities.

PREVENTION THROUGH PROTECTION

Health care providers adjust personal protective equipment before entering an Ebola treatment unit in Liberia. Ebola spreads through contact with an infected person's bodily fluids, so health care workers are at high risk of infection. Helping host nations implement rigorous protocols for donning and removing personal protective equipment is one key to containing outbreaks, and one line of effort for JPM-MCS in collaboration with WHO and others. (Photo by Athalia Christie, CDC)

MAPPING THE STARTING POINT

U.S. Navy Lt. Andrea McCoy tests a patient sample for the Ebola virus at a Naval Medical Research Center mobile laboratory in Liberia. DOD provided diagnostic test kits that confirmed the first cases of Ebola in Sierra Leone, and subsequently delivered more than 4,000 additional tests to the coordinated response. (Photo by U.S. Army Africa/CDC)

JPM-MCS is sponsoring the Joint Mobile Emerging Disease Intervention Clinical Capability, in partnership with Ugandan medical authorities, to build a research capacity that can deploy to remote treatment units during an outbreak. A study of severe infections in austere settings, scheduled to begin in August, will provide a baseline activity to enable staff recruitment, training and maintenance of medical and research skills.

LOOKING AHEAD

Operation Desert Storm and the ongoing civil war in Syria underscore the threats posed by chemical and biological weapons. JPM-MCS delivers products to strengthen medical readiness against the entire spectrum of chemical, biological, radiation and nuclear weapons. Successes include a diagnostic device that identifies six biological weapon agents, an autoinjector to deliver chemical agent antidotes, a smallpox vaccine mass-produced using state-of-the-art methods, and a capability to expand the manufacturing of medical products.

Ongoing projects include four next-generation antidotes for chemical agents and vaccines and treatments for 12 biological weapon threats. Countermeasures for radiation and nuclear threats are coordinated in partnership with BARDA. These enhance the ability of the U.S. military to fight and win in chemical, biological, radioactive and nuclear theaters of operation.

CONCLUSION

JPM-MCS is a defense management organization dedicated to the development of medical products to counter biological warfare threats, producing diagnostic tests, a vaccine candidate and treatments that supported humanitarian relief efforts during a catastrophic disease outbreak. These capabilities would not have been possible without investment in a biological defense program. The response to the Ebola outbreak demonstrates that medical countermeasures for biological warfare defense under field conditions are adaptable to the inevitable and dynamic challenges of naturally occurring epidemics in austere settings.

It also underscores the versatility and value of DOD's biological defense program and the products it generates. For example, having three treatment options ready to deploy against Ebola, each with a different mechanism of action, was a result of DOD's balanced portfolio. This is by design and benefits the global medical community. The coordination of biological defense and public health response is essential to optimize outcomes and ensure efficient use of resources, because the challenges posed by both biological weapons and natural epidemics are open-ended. Though this particular outbreak has ended, continued funding and study will be needed to prevent and manage future outbreaks.

For more information on the DOD response to the Ebola epidemic, go to ***http://archive.defense.gov/home/features/2014/1014_ebola/****.*

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The KING of BATTLE GETS *STRONGER*

PEO Ammunition adapts new technology to produce improved, more lethal ammunition for 155 mm artillery.

by Mr. Peter Burke and Ms. Tara Sarruda

Since the 1970s, ammunition improvements for 155 mm artillery systems have resulted in U.S. dominance of long-range artillery weapon systems. But with continuous change in threats worldwide, the rapid introduction of new technology and our adversaries' adaptations, the U.S. faces new challenges. Defeating large formations of enemy armored vehicles will require new ammunition with improved lethality for 155 mm artillery while minimizing its negative effects on friendly troops and noncombatants.

To ensure that 155 mm field artillery keeps pace, the Program Executive Office (PEO) for Ammunition is executing the 155 mm Cannon-Delivered Area Effects Munition (C-DAEM) program, drawing on lessons learned from past efforts and harnessing the best of today's technology to enable defeat of personnel or vehicles spread over a large area. Such targets, given their ability to move and the large distances between them and U.S. artillery, are defined as "poorly located area targets," where "poorly" reflects a high uncertainty as to their exact location.

An analysis of alternatives (AOA) is underway to model and identify the best solution set of new munitions and, in turn, to inform the requirements of the program's capability development document. Plans call for engineering and manufacturing development (EMD) to begin in the first quarter of FY21. In the interim, the science and technology community will be testing prototype munitions suitable for firing from 155 mm platforms to demonstrate technology readiness level 6—a significant achievement in the material development process, signifying that a system-level prototype has been successfully demonstrated in a relevant environment and is ready to start EMD. The Army is also executing a bridging strategy to quickly qualify highly mature and off-the-shelf munitions to begin fielding in FY19.

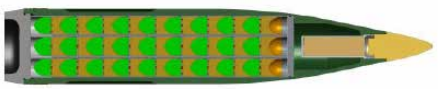
AMMUNITION EVOLUTION

From the mid-1970s to the mid-1990s, the Army produced large quantities of Dual-Purpose Improved Conventional Munition (DPICM) grenade carriers. The M483A1 and M864 DPICM carriers would be fired in volleys, and their time fuze would expel the grenades (88 from the M483A1, 72 from the M864) over personnel or vehicle formations to

achieve fragmentation and penetration effects upon impact.

Although grenades dispensed in large numbers from artillery projectiles or rockets have a very high military utility, rounds now in the U.S. stockpile do not meet the Office of the Secretary of Defense's goal of less than 1 percent unexploded ordnance (UXO). Their use leaves large amounts of UXO, resulting in hazards to friendly troops later passing through the targeted area and to noncombatants who come across an unexploded grenade on the ground. Future development programs that use this concept of delivering large numbers of grenades must meet the goal of less than 1 percent UXO.

In the 1980s, the Sense and Destroy Armor (SADARM) projectile added "smarts" to dispensed cargo with an even more lethal punch. The SADARM projectile contains two sensor-fuzed munitions, which, after expulsion from the carrier, scan the ground during descent for armored vehicle targets. Upon detection, they fire an explosively formed penetrator (EFP) through the target's roof, defeating the vehicle.



XTRA RELIABLE

ARDEC is developing several concepts, including the DPICM XL, to defeat widely dispersed personnel and vehicle targets as part of the CMRT program. The XL contains 60 munitions and high-reliability fuzing to ensure that it detonates as planned. (Image courtesy of PEO Ammunition)

In 2007, yet another significant advance occurred with the fielding of the Excalibur projectile. Excalibur is a coordinate-seeking, high-explosive (HE) projectile that uses an onboard GPS sensor to hit targets at extended ranges with accuracy of less than 2 meters' circular error probable, or miss distance.

Finally, the Precision Guidance Kit (PGK), which is a GPS kit with fuzing functions, turned the U.S. supply of conventional HE projectiles into near-precision ammunition. The PGK is placed on the nose of an M795 or M549A1 HE projectile, is programmed with the target's GPS coordinates and guides itself to the coordinates with accuracy of less than 30 meters' miss distance. Excalibur and PGK are in full-rate production and have proven to be extremely successful in today's fight.

THE FUTURE IS HERE

Planning for conflict with a near-peer competitor, of the kind feared during the Cold War, has resulted in a new framework of strategic thinking and analysis. The C-DAEM AOA is simulating the use of current and near-term technology against our current threats to develop the program's requirement document. The best munition or mix of munitions will determine the next steps to bring this capability into the hands of our warfighters as quickly as possible. This study, led by the U.S. Army Training and Doctrine Command, is being supported by the Fires Center of Excellence and the U.S. Army Armament Research, Development and Engineering Center (ARDEC). The main goals of C-DAEM are to:

- Develop and deliver new and improved capabilities that will provide highly lethal effects on a wide spectrum of stationary or moving complex target sets (personnel and vehicles), where their exact position has high uncertainty.

AMMO WITH A BRAIN

Industry has offered several concepts for new 155 mm ammunition. SMArt 155 is a German-made artillery round that contains two submunitions that neutralize stationary and moving armored vehicles. Its multiple self-destruct mechanisms ensure that it meets national and international requirements to limit the amount of UXO left on the battlefield. (Image courtesy of PEO Ammunition)

- Provide greater range and lethality to defeat enemy artillery counterfire.
- Deliver efficient effects against personnel and light to heavy mechanized vehicles in poorly located and GPS-degraded or -denied environments.
- Deliver a modernized capability to replace the aging legacy stockpile, with increased reliability that improves effectiveness for our troops while nearly eliminating UXO dangers to friendly forces and civilians.

Given that the C-DAEM program may not complete EMD until FY23, the Army

BATTLE-PROVEN, COMBAT-READY

Soldiers assigned to 2nd Infantry Division Artillery, 7th Infantry Division (ID) fire an M777 155 mm howitzer at Orchard Combat Training Center, Idaho, in October 2016. PEO Ammunition is exploring several new ammunition capabilities that will improve the lethality of 155 mm artillery while minimizing its impact on friendly troops and noncombatants. (Photo by Capt. Brian Harris, 16th Combat Aviation Brigade)

has approved a directed requirement to get a capability into the field starting in 2018. To provide an improved replacement capability as quickly as possible, PEO Ammunition's Project Manager for Combat Ammunition Systems, headquartered at Picatinny Arsenal, New Jersey, is executing a bridging strategy to accelerate the development of the U.S. Army's XM1128 extended-range HE projectile, to procure the BONUS SFM round from Sweden and to qualify the M999 grenade-carrying projectile from Israel.

The XM1128 projectile is in its final stages of technology development and is more lethal than the current HE family at longer ranges (18 miles). The BONUS SFM is similar in concept to the U.S. SADARM, has been qualified by the U.S. Army and is in production. It has two submunitions with advanced sensors and is designed to defeat heavy target sets. After ejection from its artillery shell over the target area, each submunition independently searches for armored vehicles, and upon detection, fires an EFP through its roof to defeat the target.

The M999 contains improved conventional munitions (tailored to defeat personnel and light targets), and is designed to meet the UXO threshold of less than 1 percent. Together, these three new munitions for the U.S. Army's inventory will provide near-term capabilities while the C-DAEM is in its early development stages.

ARDEC S&T CONCEPTS

ARDEC is developing several concepts to defeat personnel and vehicle targets spread over a large area as part of the Cluster Munition Replacement Technologies (CMRT) science and technology program. CMRT delivers area effects on poorly located area targets, ranging from personnel light targets to medium mechanized targets.

PRAXIS is an improved conventional munition that dispenses four full-bore submunitions. Each submunition is equipped with a highly reliable, tri-mode fuzing system, with preformed tungsten fragments in the warhead.

Although grenades dispensed in large numbers from artillery projectiles or rockets have a very high military utility, rounds now in the U.S. stockpile do not meet the Office of the Secretary of Defense's goal of less than 1 percent unexploded ordnance.

Another concept, resembling the legacy DPICM munitions, is the DPICM XL. This munition contains 60 submunitions, each equipped with a high-reliability fuzing system with redundant systems to ensure that it detonates as planned. Target sets include personnel, light materiel and up to medium armored targets, accomplished with an advanced warhead designed to penetrate the skin of an armored vehicle. Both PRAXIS and DPICM XL are designed to meet the policy of less than 1 percent UXO.

To address extended-range capabilities, ARDEC is developing a rocket-assisted projectile that is capable of attaining ranges as far as 24 miles from the U.S. Army's 39-caliber weapon system, the XM1113. With lethality equal to the legacy M549A1 but exceeding its range by at least six miles, this projectile is under consideration as part of the C-DAEM suite of munitions. It contains a single warhead that will not leave behind submunition UXO. For improved accuracy, the program is working to obtain compatibility qualification with the PGK fuze.

NAVY, INDUSTRY ALSO WEIGH IN

The Office of Naval Research, working with Naval Sea Systems Command, is also developing its own concept for area effects: the High Reliability DPICM Replacement. It is a cargo projectile, similar to DPICM XL, that addresses area effects and poorly located targets with a large number of submunitions. Each submunition will be highly reliable and outfitted with advanced electrical fuzing technologies, designed to exceed 99 percent compliance with the U.S. UXO policy.

Industry has offered several concepts for the C-DAEM program, including advanced unitary warheads that would not create submunition UXO. Orbital ATK Inc.'s Lethality Enhanced Ordnance concept uses a noncluster munition concept warhead inside a 155 mm projectile. Raytheon Missile Defense has various concepts, leveraging fielded 155 mm Excalibur variants.

Foreign concepts under evaluation include SMArt155, a German sensor-fuzed munition that is similar to BONUS MkII and SADARM. SMArt155 is able to engage and defeat poorly located heavy armor targets using two EFP submunitions. Each submunition uses both infrared and millimeter-wave radar systems to locate targets and contains two seekers, enabling operation in heavy countermeasure environments. Similar to BONUS, SMArt155 has been previously evaluated and demonstrated in U.S. Army 39-caliber weapon systems.

CONCLUSION

Artillery, the king of battle, will soon have modernized assets that will perform effectively in longer-range missions, with increased lethality. New and improved munitions within the C-DAEM portfolio will offer versatile artillery capabilities to combat both near-term and future engagements with precision area effects and against threats from personnel to heavy armor. Overall readiness will be improved with newer munitions that offer increased reliability over the legacy cluster munition stockpile. PEO Ammunition is actively working with industry, government science and technology centers and foreign partners to quickly field combat multipliers to maintain U.S. dominance for indirect fire for decades to come.

For more information, go to ***http://www.pica.army.mil/peoammo/****;* ***https://picac2cs9.pica.army.mil/pmcas/****;* *or* ***http://www.ardec.army.mil/****.*

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MS. TARA SARRUDA works for the Cannon Artillery Division at ARDEC, serving as chief engineer for the C-DAEM program. She holds an M.S. in mechanical engineering manufacturing systems from the Stevens Institute of Technology and a B.S. in mechanical engineering from Lafayette College. She is Level III certified in systems engineering.

TECHNICALLY SPEAKING

LANGUAGE LESS FOREIGN

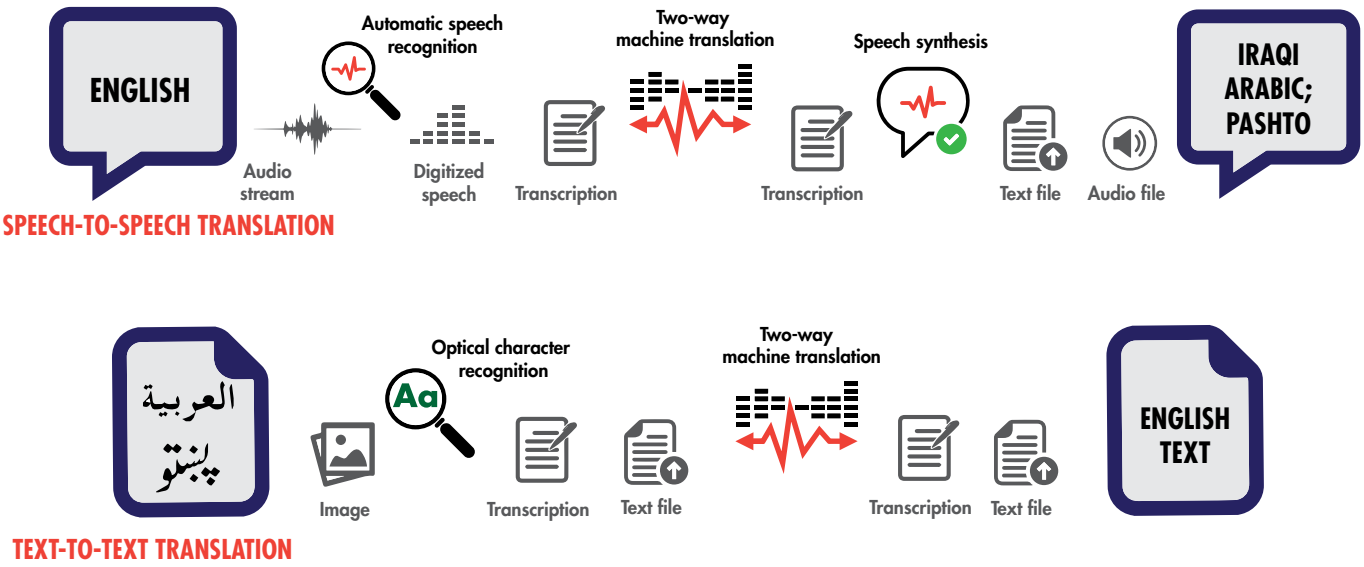
A downloadable, Army-specific translation app made possible by machine learning enables individual Soldiers to communicate anywhere, with or without internet access or local translators.

by Mr. Michael Doney, Dr. Christina Bates and Mr. Tracy Blocker

Today's more expeditionary Army needs interpreters and linguists, but they are expensive to train and always in short supply. In another case of science fiction becoming science fact, the Army has created a partial solution to the language barrier: the Machine Foreign Language Translation System (MFLTS). Right now, MFLTS consists of two apps, one for real-time, two-way, speech-to-speech translation and one for text-to-text translation of electronic documents, webpages and social media.

Each application has two main parts. One is the core app, which handles all of the interaction between the user and the underlying tools. You could call it the "work manager," because it helps the other parts of the translation system "talk" to one another.

The second important part is the language pack, which contains language-specific, machine-trained models and dictionaries needed to make translations. The language packs are modular plug-ins that users can install and remove to do the needed translation work in the user's environment.



LOUD AND CLEAR

MFLTS is a Soldier-mounted system that provides speech-to-speech translation in two spoken languages, Iraqi Arabic and Pashto, and text-to-text translation in Modern Standard Arabic. The Army plans to add more languages to the system. The two translation functions process language in different ways, but both rely on advances in machine-learning technology to deliver accurate translations. (Graphic by U.S. Army Acquisition Support Center)

MACHINE LEARNING 101

The machine learning that supports the developments in human-language technology underpinning MFLTS draws on computer science, neuroscience, and artificial-intelligence research and theory on ways to enable a computer to learn or do something on its own without explicit programming by a human to do so. Without machine learning, MFLTS could be only as good as the humans who feed the system data and statistical information; thus there would be a built-in limit to how well it could translate.

Artificial neural networks, based loosely on the human brain's structure, are what make machine learning possible and offer the potential to create truly artificial intelligence sometime in the future. The networks that power machine intelligence learn in a very humanlike way: As Gideon Lewis-Kraus wrote in a Dec. 14, 2016, New York Times Magazine article about Google's work on machine learning, they "acquaint themselves with the world via trial and error, as toddlers do."

The way that MFLTS is put together, these two parts are equally involved in translating. When a Soldier starts a translation session, the manager part of the app starts a session between the Soldier and the language pack's translation tools that the Soldier will need to get the job done. During translation, the app captures input, manages processes and provides the translation to the user.

MAKING MAGIC

The real magic of MFLTS lives deep within the language packs, where science and art come together to enable software to hear, understand and interpret as much like a human linguist as possible.

Inside language packs are two or more language components that contain what are called "probabilistic models," developed by software scientists and engineers using advanced machine learning techniques. An example of a probabilistic model is the way a smartphone "guesses" what you are typing before you've finished.

Of course, translation is much more complex, so these machine learning techniques include processing large volumes of highly structured, annotated language data to develop models that recognize the relationships among the elements of speech. For the speech app, these language components are the automated speech recognizer, the machine-translation engine and the text-to-speech speech synthesizer.

A microphone captures speech, and the automated speech recognizer turns it into text data by using a probabilistic model that finds the most likely match between the speech that's been converted to text and what the machine has learned. After the speech is converted to text, the text shows on the display so the user can decide whether it is correct. This is how the Google Assistant, Apple's Siri and others "understand" you when you ask them to find the next nearest gas station, or when you ask Amazon's Alexa to play a specific song from your music library.

The automated speech recognizer doesn't complete all of the requested translation task; its job is done when it passes the recognized speech in text to the next process, machine translation.

CORE PROCESSES

Inside a language pack, the machine-translation engine is the component that performs the "magic" of the actual translation. Like the automated speech recognizer, a machine-translation engine uses probabilistic models that are trained using dual-language sets of data developed with the expertise of people fluent in both languages in a language pair—for example, English and Arabic.

Not surprisingly, developing machine-translation engines for unusual pairs of language is often very labor-intensive and expensive because of the scarcity of data and linguists proficient in both languages. As developers of the automated speech recognizer's model have done, engineers and scientists who are creating machine-translation models rely on techniques for model training that are a combination of science and art.

Machine translation probabilistic models find the best match between the source and target languages and, like the automated speech recognizer, then provide text output in the target language to a speech synthesizer and to a display, using the target language's character set.

Finally, for the speech app, the text-to-speech language part of the app is a synthesis program that produces audible speech in the target language. Like the automated speech recognizer and machine translation, the text-to-speech component relies on extensively trained speech-synthesizing models that provide the text-to-speech conversion.

After receiving the text from the machine-translation engine, the text-to-speech function converts the text into spoken language by putting together words or phrases from recorded speech of the target language. MFLTS then plays the text-to-speech content on the internal or external speaker of, typically, a smartphone.

Working together, these language components are the "brain" of MFLTS, appearing to hear, understand and translate English into another language.

Let's say that a Soldier has just translated speech from an Arabic-speaking local. Now the Soldier needs to reverse the process, translating from English to Arabic. That's no problem; it's why the MFLTS language packs always travel in pairs.

A SIMPLE SETUP

MFLTS' apps are available for the smartphone-like Nett Warrior device and for download to use on a laptop, as in this configuration, which also includes a scanner to input documents for text translation and a microphone for speech translation. (Photos by Tracy Blocker, MFLTS Product Office)

A STRONGER CONNECTION
A Soldier and a role-player standing in for an Arabic-speaking local test MFLTS two-way speech translation app at the Army Expeditionary Warrior Experiment (AEWE) 2016 at Fort Benning, Georgia. AEWE is the U.S. Army Training and Doctrine Command's live, prototype experimentation campaign.

FROM TEXT TO TEXT

With the MFLTS text translation app, Soldiers can translate text-based media, such as webpages and posts on Twitter and other social media. Like the speech app's machine-translation engines, the text-to-text engine is trained on a large body of language data.

Text translation is typically quick and highly accurate. Because it does not have to recognize speech, which can vary a lot between individuals, or synthesize it, there are fewer sources of errors in the final translation.

CONCLUSION

For many Soldiers, the MFLTS speech app may be the best alternative to a human linguist, especially if there isn't one around. The Army's MFLTS program intends to leverage major advances in language translation technology and machine learning to provide a cost-effective capability that will enable Soldiers to break through the language barriers that the expeditionary Army will continue to encounter.

MFLTS has been in service since December 2016, when it was first fielded on the smartphone-like Nett Warrior devices used by the 1st Brigade, 82nd Airborne Division. The system is also being used in support of Operation Inherent Resolve in Iraq.

Based on a 2017 congressional increase in research, development, testing and evaluation funding for the Army MFLTS program, the MFLTS Product Office anticipates adding several languages to the portfolio, potentially to include Russian, Dari, Urdu, Farsi and Korean, within the next 12 to 18 months. The product office is assigned to the Project Manager for Distributed Common Ground System – Army in the Program Executive Office for Intelligence, Electronic Warfare and Sensors.

For more information about the MFLTS program, go to ***https://peoiews.army.mil/dcgsa****.*

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DR. CHRISTINA BATES provides contract support to various organizations within the Army acquisition and research, development and engineering communities as a strategic analyst, planner and strategic communications expert. Bates holds a Ph.D. in communication with an emphasis on organizational communication and behavior from Arizona State University; a J.D. from Boston University; an M.S. in mass communication, with distinction, from Boston University; and a B.A., cum laude, in sociology and communication from Boston College. She is a Lean Six Sigma master black belt.

MR. TRACY BLOCKER is the MFLTS product office representative to the U.S. Army Training and Doctrine Command at Fort Huachuca, Arizona. He holds a B.A. in English from Georgia Southern University and is a graduate of the Post-graduate Intelligence Program of the Joint Military Intelligence College (now the National Intelligence University). He is a retired Army military intelligence officer who served in tactical and operational units.

May 1987

Establishment of Program Executive Officers (PEO)

PEO C3T
PROGRAM EXECUTIVE OFFICE COMMAND CONTROL COMMUNICATIONS-TACTICAL

CELEBRATING

30

THIRTY YEARS
OF INNOVATION

Implementation of the Goldwater-Nichols Department of Defense Reorganization Act of 1986 removed Project Managers from Army Materiel Command (AMC) control and placed them under Program Executive Officers, who report directly to the Army Acquisition Executive (the Assistant Secretary of the Army for Research, Development, and Acquisition). The command continued to provide functional services to the PEOs and their PMs under the matrix support concept. The Communications-Electronics Command (CECOM) at Fort Monmouth supported three PEOs: Command and Control Systems (CCS), Communications Systems (COMM), and Intelligence/Electronic Warfare (IEW).

PEO COMM was staffed by 250 military and civilian employees, managed more than 100 programs, and had a budget of $2.9 billion. It was responsible for PM Global Positioning System (GPS), PM Multi Service Communications Systems (MSCS), PM Mobile Subscriber Equipment (MSE), PM Position Location Reporting System/Tactical Information Distribution System (PLRS/TIDS), PM Regency Net (RN), PM Satellite Communications (SATCOM), PM Single Channel Ground and Airborne Radio System (SINCGARS) and PM Single Channel Objective Tactical Terminal (SCOTT).

PEO CCS was staffed by 364 military and civilian employees and had an annual budget of $1.9 billion. It was responsible for six PMs: PM Air Defense and Control Systems (PM AD-CCS), PM All Source Analysis System (ASAS), PM Combat Service Support Control System (CSSCS), PM Common Hardware/Software (CHS), PM Field Artillery Tactical Data Systems (FATDS), and PM Operations Tactical Data Systems (OPTADS). Three PMs were at Fort Monmouth. AD-CCS was at Redstone Arsenal, Alabama; ASAS at Fort McLean, Virginia; and CSSCS at Fort Belvoir, Virginia.

MR. CHRISTOPHER AYOUB

COMMAND/ORGANIZATION:
Joint Program Manager for Towed Artillery Systems, Program Executive Office for Ammunition and Marine Corps Program Executive Office for Land Systems

TITLE:
M777 India production lead, program management engineer

YEARS OF SERVICE IN WORKFORCE: 7

DAWIA CERTIFICATIONS:
Level II in engineering; Level I in program management

EDUCATION:
B.S. in mechanical engineering, Rutgers University

"Ensuring that there is an institutional knowledge that's being maintained and developed for the future by keeping production lines operational is vital to the artillery community over the long term."

India's howitzers have New Jersey roots

Two M777A2 howitzers arrived in India in May, marking an early milestone under a contract that eventually will provide that country with 145 M777A2s starting in late 2018. Christopher Ayoub is a key player in that effort, as program management engineer for the Program Manager for Towed Artillery Systems (PM TAS) within the Program Executive Office (PEO) for Ammunition at Picatinny Arsenal, New Jersey.

As the M777 India production lead, Ayoub helped establish a letter of offer and acceptance between India and the United States in December 2016, and a contract with the prime contractor shortly thereafter. He assisted in answering inquiries from India and was the government's lead technical evaluator in establishing the contract, coordinating various reviews by the team throughout the technical evaluation and negotiation process.

The howitzer components and subassemblies will be manufactured in the United States and United Kingdom, then shipped to India to be put together at the assembly, integration and test facility. Watervliet Arsenal in New York will manufacture the cannon assembly, to be provided as government-furnished equipment (GFE). In addition to supplying the howitzers, PEO Ammunition, along with BAE Systems, will provide technical manuals, training programs and engineering support to develop firing tables so that the Indian army can fire its own ammunition.

PM TAS will begin training the Indian army on the howitzers next year.

Ayoub leads a team of government and contractor employees through the cost, schedule and performance aspects of the M777 production program. The team is responsible for the GFE contracts, the prime contract, materiel handover and warranty portions of the foreign military sales (FMS) case.

With roughly 20 people, the team represents an array of skills, Ayoub said. "We have people with experience in design, production and program management, and people with experience in working with other government agencies and acquisition centers—it's a true integrated product team."

Ayoub and his team recently encountered a production issue at a manufacturing site for a key component. "The biggest challenge we face is to make sure we're monitoring priorities at government facilities, and that we're keeping an eye on production and delivery schedules," he said. "Through communication and developing a contingency plan, we were able to mitigate the risk that the throughput problem might have caused."

The India FMS case, which also covers five years of spare parts, "turns the production lines back on" for the howitzer, Ayoub noted. "As the M777 reaches the sustainment and active-refresh portion of its life cycle, being able to realize cost savings for spares due to economies of scale on an active production line has benefited all customers," he said. In addition, "Ensuring that there is an institutional knowledge that's being maintained and developed for the future by keeping production lines operational is vital to the artillery community over the long term."

He has traveled to India a handful of times as part of the project, sitting in on meetings at the Ministry of Defense to discuss the FMS case with high-ranking members of the Indian army's Directorate General for Artillery, and touring the facility where the joint receipt inspections and materiel handover for all deliverables will take place. As the contract progresses, someone from his team will be in India each month.

"The experience has been eye-opening," he said. "The difference in the culture is very interesting to see and, from a professional development standpoint, I would never get to sit through meetings with members of the U.S. Army at those levels. It provides insight into what officers at that level are looking for when being briefed."

An engineer by training, Ayoub got his start in acquisition in 2010. After college, he was looking for an employment opportunity "that was not 'traditional.' Having interviewed at Picatinny Arsenal, I knew it was a good fit for what I was looking for," he said. "Seven years later, it is just what I thought it would be: Every day means a new challenge, and never is one day like the previous one."

In 2013, Ayoub took a temporary position as the component acquisition lead for the 105 mm M119A3 howitzer, which ended up having a long-term impact on his career. "At the time, I had been managing my own acquisition efforts, but in the component acquisition role, I was forced to expand my knowledge of procurement contracts and the impacts that they had at a programmatic level," he said. "I had the opportunity to sit in on higher-level meetings, and that helped expand my knowledge base for leading a program. That assignment was also the first time in my acquisition career that I managed a team."

Also influential to Ayoub's career was his decision to expand his skills by getting his Project Management Professional certification. "That certification gives me a toolset to evaluate the health of any program, as well as an understanding of the indicators for making that assessment," he explained. "It's invaluable for anyone looking to further a career in project or program management."

Finding "a core group of leaders and peers" is also a big factor in long-term career success, he said. Officially part of the U.S. Army Armament Research, Development and Engineering Center and assigned to PM TAS, Ayoub had access to two different groups of potential mentors.

"I had the chance to be mentored by various people in different stages of their careers who were able to provide insight on both technical and programmatic perspectives," he said. "The guidance I have received from the branch chiefs, divisions chiefs, program managers, functional leads, project leads and peers has been instrumental in helping me get to where I am."

—MS. SUSAN L. FOLLETT

WHERE THERE'S SMOKE

Spc. Vincent Ventarola, assigned to Field Artillery Squadron, 2nd Cavalry Regiment, fires an M777A2 howitzer during Dynamic Front II, conducted March 6-9 in the Grafenwoehr Training Area, Germany. The exercise enabled the U.S., Germany and Czech Republic to synchronize their artillery capabilities. Novel approaches to acquisition will make the software supporting artillery command and control easier to use, upgrade and sustain. (U.S. Army photo by Staff Sgt. Jennifer Bunn, 2nd Cavalry Regiment Public Affairs)

GIVE MORE, GET MORE

PM Mission Command gave potential developers of the new artillery command-and-control system more time, more information and more latitude to approach the problem in new ways. In return, the government got more competitive proposals and a more flexible solution that ideally will yield a more user-friendly interface.

by Ms. Sandra Lindecamp, Ms. Elizabeth A. Keele and Mr. Dan Lafontaine

Like any complex command-and-control system, the Advanced Field Artillery Tactical Data System (AFATDS) has undergone multiple software upgrades and enhancements since its first fielding in 1995. AFATDS provides critical fires command-and-control capability for the Army and Marine Corps, and the upgrades have included automatic processing of fire requests, munition updates, the generation of multiple tactical fire mission solutions, the monitoring of mission execution, and the support, creation and distribution of fire plans. The system's original developer performed all of the upgrades, which posed several problems:

- Thirty years of development resulted in many software upgrades and solutions being added on after initial fielding, which resulted in a nonmodular code base (the source code for the software) and increased the cost and complexity of sustainment. Nonmodular code is highly interdependent and often affected by long processing times—problems exacerbated by the added-on upgrades.
- The previous architecture was not designed to withstand or address cybersecurity threats.
- The code base includes approximately 16 programming languages, many of which are not currently in wide use across industry. As a result, it's difficult and costly to find personnel with the right experience to work on the system.
- A complex system with only one graphical user view requires users to filter extensive data to perform required functions—performing a function with AFATDS requires numerous mouse clicks and opens several browser windows—as well as 160 hours of new equipment training.

The Army faced the additional challenge of migrating AFATDS to its common operating environment (COE), an initiative that is transitioning stand-alone warfighting capabilities to integrated software applications. To support a more intuitive user interface and to enable the migration of AFATDS to the COE,

the Army recently executed an innovative competitive contract and procurement approach for the next generation of AFATDS software.

More than 4,000 AFATDS systems have been fielded worldwide. The program is managed by the Project Manager for Mission Command (PM MC), assigned to the Program Executive Office for Command, Control and Communications – Tactical (PEO C3T). Over the past year, PM MC, as well as its Product Manager for Fire Support Command and Control, developed an acquisition strategy with the goal of improving cost, performance and schedule for the next generation of AFATDS, 7.0, which is projected to begin fielding in 2020.

This approach, which mirrors software development best practices, opened up competition for software development and enabled the Army to reduce the training burden associated with AFATDS. It aimed to do so by increasing application usability through a role-based capability with a more intuitive user interface; providing embedded training capabilities; creating a service-oriented architecture that reduces sustainment costs; and incorporating COE services to allow the Army to migrate to a common infrastructure, thereby reducing the need to develop, manage and sustain multiple stand-alone systems.

The strategy included asking industry to develop innovative approaches to modernizing the existing AFATDS cyclical code (which totaled more than 7 million lines), enhancing usability, reducing the training burden and ensuring integration into the COE infrastructure. It also sought sustainment efficiencies as the code had become more difficult and costly to maintain after more than 30 years of add-on development.

The end goal is that AFATDS 7.0 will modernize the code, enhance modularity and incorporate more modern programming languages, resulting in cost avoidances and efficiencies during sustainment. It also will feature a service-oriented architecture that organizes services and functions into layers to reduce the complexity of the code and system architecture.

Additional cost avoidances will be realized by reducing the AFATDS training burden by incorporating TurboTax-like training capabilities and a more user-friendly graphical user interface. For example, a user learning a task can watch a 30-second video showing what steps to perform, request a simulation of the task, or request a detailed 30-minute video. It also provides an avatar trainer that can track movements and progression through training simulations.

These upgrades will capitalize on the COE infrastructure to avoid the duplication of cost associated with a redundant AFATDS-specific infrastructure.

To achieve these goals, PM MC took the somewhat unusual step of releasing source code and all requirements to industry for an extended period of time via a secure means. That step paid off, resulting in the outcome the team was aiming for.

FOSTERING INNOVATION

The AFATDS 7.0 solicitation marks the first time an AFATDS development effort had been competed through full and open competition since its inception in 1981. Therefore, in alignment with DOD's Better Buying Power initiatives, the Army's first step was to maximize competition, as well as to encourage high-quality and innovative proposals.

To accomplish this, PM MC took three additional market research steps, compared with typical solicitations, for AFATDS 7.0. First, the team posted a sources sought notice and then two iterations of requests for information (RFIs) on the Federal Business Opportunities website for eight months before a draft request for proposal (RFP) was released. In addition, the

TAKING LESS TIME TO GET UP TO SPEED

Staff Sgt. Nicole Mayberry completes a practical exercise using AFATDS at a field artillery military occupational specialty course hosted by the Wisconsin Army National Guard's 426th Regional Training Institute at Fort McCoy, Wisconsin, in January 2016. New approaches to AFTADS upgrades will yield a system that's easier to operate and faster to learn, and is expected to begin fielding in 2020. (U.S. Army photo by Capt. Joe Trovato, Wisconsin Army National Guard)

PINPOINT ACCURACY

Lt. Col. Christopher Anderson, product manager for fire support command and control, discusses the new Precision Fires-Dismounted (PF-D) system during a visit from Steffanie B. Easter, acting assistant secretary of the Army for acquisition, logistics and technology, to Aberdeen Proving Ground, Maryland, May 11. The new PF-D system has greatly expanded the ability of forward observers to conduct completely digital calls for fire, providing field artillery Soldiers with precise target coordinates. (U.S. Army photo by Dan Lafontaine, PEO C3T Public Affairs)

government publicized the effort with two advanced planning briefings to industry. The extra steps stoked industry interest and provided detailed information about AFATDS requirements and government goals that better informed innovative proposal development.

With extra time and additional opportunities to learn about the government's needs, industry was able to invest more time and effort in responding to the AFATDS 7.0 RFP, and the government was able to capitalize on industry's pre-award innovation.

CRACKING OPEN THE CODE

PM MC took a significant step to spur industry innovation by releasing the latest version of the government-owned AFATDS source code to all potential offerors with the first RFI. Releasing the code was critical to ensure a level playing field among industry after more than 30 years of a single AFATDS developer.

This release of government intellectual property was a sharp departure from contracting norms. However, it allowed industry to become familiar with the code base it would be charged with modernizing. Further, because the government allowed industry to retain the code for eight months before initial proposals, industry was able to experiment with multiple modernization approaches and define modernization risk. This allowed offerors to weigh modernization approaches and choose the lowest-risk solution based upon their unique capabilities—a significant benefit to the government because it allowed for the identification and the mitigation of risk before actual contract execution.

As the source code was released to potential vendors, PM MC took the unique step of partnering with academia to review the AFATDS code to ensure it could be modernized efficiently. This partnership with computer science experts at the University of Texas (UT) was initiated because the Army lacked the internal expertise to effectively evaluate whether the source code could be successfully upgraded. PM MC contacted the Army Fires Center of Excellence at Fort Sill, Oklahoma, which recommended UT because of an existing relationship with the university. UT experts analyzed the code and outlined viable modernization options given the state of the code and the Army's requirements and goals. Additionally, UT provided a number of risk-mitigation strategies.

The senior computer scientist who performed the analysis also supported the source selection board during proposal review and has been retained to provide ongoing support as the Army executes the contract. The UT expert provided advisory services on the feasibility of approaches, the current state of the code base and the overarching goals of modernization during the proposal review process. Those contributions ultimately helped the government understand what was technically feasible and gave the government the foundation needed to evaluate industry proposals and determine whether industry innovation successfully balanced cost, schedule and performance risks.

BRINGING BEST PRACTICES

Most significantly, the Army adapted best practices from commercial IT and software and employed a number of innovative methods in requesting potential solutions from offerors.

First, the Army asked for a capability without directing how to achieve it, releasing a statement of objectives that only outlined the overarching modernization goals. This statement of objectives was in contrast to typical RFPs, in which the government outlines specifically what

TEAMING UP

Sgt. Johnnie Morton, part of a gun crew assigned to Field Artillery Squadron, 2nd Cavalry Regiment, loads a 155 mm artillery round onto a M777A2 howitzer during Dynamic Front II. In updating artillery command-and-control software, PM MC used an unorthodox approach that involved developers earlier in the process and to a greater degree than is typical. (U.S. Army photo by Staff Sgt. Jennifer Bunn, 2nd Cavalry Regiment Public Affairs)

it wants from proposed solutions via a statement of work or a performance work statement. The underlying goal of the Army's approach was to seek innovation by allowing offerors flexibility to define their own solutions, uninhibited by excessive government direction.

Second, the government performed in-depth research to develop a plan of performance-based incentives and disincentives to move industry in the direction of creative approaches. To ensure those incentives and disincentives were properly targeted at motivating industry, the acquisition team mapped out all possible incentive and disincentive scenarios for cost, performance and schedule—54 in all—as well as every possible fee industry could earn, and it graphically presented that data to demonstrate where industry should target its efforts.

Third, the government gave industry maximum flexibility to determine its own modernization strategies by requiring interested offerors to provide their own performance work statements, integrated master plans and contractor work breakdown structures with their proposals. These documents were the backbone of their proposals and gave the government considerable insight into each offeror's proposed approach as well as a much better understanding of post-award execution and risk mitigation. Together, these activities enabled the government to better validate the soundness of these fairly complex industry proposals.

CONCLUSION

All of these efforts combined resulted in an exemplary AFATDS 7.0 acquisition. Industry seized the opportunity to be innovative, and each had a unique approach to meeting the government's objectives. The investments made by industry exceeded expectations, resulting in unique opportunities to decrease risk in a pre-award environment and realize greater efficiencies post-award. In the end, four offerors submitted proposals and the company awarded the contract was not the incumbent. The awardee surpassed government's expectation for implementing innovation and flexibility.

For more information, go to PEO C3T's website at ***https://www.army.mil/peoc3t****.*

MS. SANDRA LINDECAMP is acquisition branch chief for PM MC. She holds a B.S. in business administration from the University of Maryland University College. She has served as an Army warranty contracting officer for more than 12 years and has been assigned to PM MC for the last six years. She is an Army Acquisition Corps member and is Level III certified in contracting and in program management.

MS. ELIZABETH A. KEELE is an acquisition consultant for G2 Software Systems Inc., providing support to PM MC. She holds a B.A. in political science from National University and has 12 years of experience assisting the Army and Navy in developing and executing acquisition strategies. She has been recognized for outstanding service throughout her career; most notably, she was part of a team that received the Space and Naval Warfare Systems Command Lightning Bolt Award. She holds a Lean Six Sigma green belt.

MR. DAN LAFONTAINE, a public affairs specialist with DSA Inc., provides contract support to PM MC. He holds a B.A. in journalism from the University of Richmond and has 10 years of experience in Army public affairs as a writer and editor.

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INTEGRATED RESPONSE

U.S. and Liberian military personnel prepare to board a U.S. Marine Corps MV-22 Osprey aircraft in October 2014 after surveying the site of a future Ebola treatment unit near Barclayville, Liberia. The U.S. military forces in West Africa during the Ebola outbreak worked well with the civilian machinery running the response, Aylward said, adding that U.S. aircraft "came in real handy getting out to some of these remote areas." (U.S. Army Africa photo by Pfc. Craig Philbrick)

Dr. Bruce Aylward

IDENTIFY. QUANTIFY. ELIMINATE.

For the World Health Organization's assistant director-general, readiness to attack disease outbreaks is a life-and-death imperative with multiple dimensions that have much in common with the U.S. military.

by Ms. Margaret C. Roth

As the World Health Organization's (WHO) go-to expert for organizing major efforts against outbreaks of deadly disease, epidemiologist Dr. Bruce Aylward's No. 1 job was ensuring the organization's readiness to decisively defeat unpredictable enemies that can brutally decimate populations anywhere in the world. That means planning and executing a meticulous disease elimination or eradication strategy with the necessary personnel, logistics, research and development and support systems and in partnership with multiple other international entities.

When the 2014 Ebola outbreak was out of control in West Africa and WHO was under fire for its sluggish response, the organization looked to Aylward for leadership. He greatly intensified the effort as special representative of the director-general from September 2014 through July 2016. Public health leaders credit Aylward with helping to turn the situation around, using essentially the same resources, by applying a precision and urgency that had been missing from WHO's field response.

Before the Ebola outbreak, his enemy was polio. Aylward led the Global Polio Eradication Initiative partnership from 1998 to 2014, overseeing and managing the effort to build capacity—personnel, vaccines, etc.—in every polio-affected country in the world. The result was to reduce to two the number of countries

where the highly infectious viral disease is still transmitted. He makes this accomplishment seem simple. "It's a matter of how you're organized and how you operate, right? And how you're capacitated to execute your strategy."

The 55-year-old Aylward, a native of Newfoundland, Canada, joined WHO in 1992, a year after earning a Master of Public Health degree from what is now the Johns Hopkins Bloomberg School of Public Health. He earned his medical degree from Memorial University of Newfoundland in 1985 and completed a residency in internal medicine in Vancouver, British Columbia. He also received training at the London School of Hygiene and Tropical Medicine. In the course of his career, Aylward has authored more than 100 peer-reviewed scientific articles and book chapters and is a 2017 inductee into the Johns Hopkins Society of Scholars.

In many respects, Aylward's approach to readiness mirrors that of DOD, which is why Army AL&T reached out to him at WHO's Geneva headquarters for this July 21 interview. When we spoke with him by phone, he'd just completed an eight-month stint in the U.N. Office for the Coordination of Humanitarian Affairs (OCHA) to lead a newly established Change Management Unit there.

Army AL&T: The U.S. Army's operating statement, "Win in a Complex World," looks at improving readiness through three particular paradigms—streamlined personnel, logistics and maintenance systems. How similar is this construct to what you look at when you're looking to improve readiness?

Aylward: I think it's actually fairly similar. With readiness, we think in terms of what our goal is to ensure that, in a complex world, exactly as the military might say, you have the plans, processes, people and capacities in place to be able to respond rapidly to the unexpected hazards you face and emergencies that they give rise to. So we might use slightly different language, but it's all about having a plan in place with the right personnel, logistics and maintenance systems, as you would say in the Army, to execute that plan.

Army AL&T: How do you plan for the unexpected? If you don't really know what's going to happen but can only conceptualize it, how do you actually build readiness in concrete terms?

Aylward: The first thing that we have to do is break down the unknown, because we actually know a lot more than we often realize. The first thing we tend to do is look at, OK, what are the possible hazards and groups of hazards we might face? Are they natural hazards or man-made, and then, within natural, are they biologic [hazards]? You then have to understand that the consequences of those hazards can be X, Y and Z.

From there you want to know, what are the vulnerabilities of different populations in different parts of the world? What are the capacities to address those? Very quickly you can build up a pretty good risk profile on which you can base your readiness work. Although the "where" and "when" something is going to happen are pretty unpredictable, especially with new infectious diseases, there are patterns over time that can help.

So we've got to be very careful about just saying, "Oh, it's unknown." We can build up pretty good risk profiles, though even then we can't just put them on the shelf. In any given corner of the world, the geopolitics may have really changed, and now the whole risk for civil disturbance or conflict has changed, so you've got to update those risk profiles as well. While these risk profiles are helpful in terms of the "where" something may

CONFRONTING THE UNKNOWN

Aylward delivers his plan for an international response to the West Africa Ebola outbreak at a September 2014 press conference at the World Health Organization at Geneva. Aylward drew on his understanding of epidemiology, disease eradication and humanitarian emergency operations to establish the strategy and lead its execution. (U.N. photo by Jean-Marc Ferré)

happen, the "when" is a little bit tougher, especially when it comes to predicting potential pandemics. Even then, we can track how the drivers of those risks are changing. What you're left with at the end of all this is the unknown part. And even there, we often know more than we give ourselves credit for.

For example, although we keep getting surprised by new emerging infectious diseases, when we look at the major pandemic risks, they're really related to two or three big groups of viruses, particularly flu viruses. When people talk about pandemics, they're usually talking about pandemic flu. A second group are the coronavirus [of which severe acute respiratory syndrome (SARS) is an example], and a third group are what we call the filoviruses, of which Ebola is one. But if we know that it's mainly those three groups, and we know how those viruses are transmitted, there's other things we can do to start building readiness.

So there's a lot we can do to reduce the unknown, to keep updating and even to start working around some of the areas of the unknown. I hate when I'm told, "Yeah, well, we don't know what's going to happen, so... ." Well, then, we better be even more prepared, frankly.

Army AL&T: And that's where some of the past patterns of your experience come in.

Aylward: Yes, absolutely. Readiness really refers to being operationally ready to mount a response across a wide range of hazards, environments, and areas of different vulnerabilities and capacities. Another key part of this is planning, where the military makes a huge emphasis. It's interesting, because in the humanitarian and public health worlds people often say, "We didn't have time to plan because it was an emergency." Well, militaries work in emergencies all the time, and the first thing they do is get a plan in place. In fact, they already have a plan for most environments. But we also need to keep very broad groups of different actors working to a common purpose, so we need to have common plans, common simulations, joint responses. This is all part of what we do to ensure that we are at a state of operational readiness, not just in our own organization, and not just with our member states, but across that much broader set of actors that may end up being called on in a response.

Army AL&T: What would you say at this point are your biggest threats and your biggest unknowns?

Aylward: The biggest threats that we have to be ready to manage, as the World Health Organization, are in the area of infectious hazards and new and emerging pathogens, most importantly a new flu virus or respiratory-borne coronavirus. These are the ones that have the potential not just for a lot of illness and death, but also to move very, very quickly.

So a lot of the work we do is to build and maintain a combination of surveillance networks as well as laboratory and vaccine production capacities around the world to be able to detect, investigate, build the tools and respond to such events when they occur. Frequently people will say to me, "We need to be prepared for these things if and when they occur." And I say, well, drop the "if," right? The No. 1 principle is that they're going to occur; we just don't know when.

Army AL&T: Can you give me an example of how past patterns have helped you in framing and planning for these not-quite-unknown threats?

None of these things work if you don't use them—you know, regularly test them and then rapidly operationalize them in crises. The problems are seldom the tools and the processes. It is more often just the sloth, let's say, or lack of resources that have led to their lying idle for too long.

Aylward: Many people are surprised, but there have been hundreds and hundreds of newly detected pathogens in the last 50 years, many of which have crossed the animal-human interface. As a result, there's been a huge amount of experience in dealing with new and emerging pathogens. Whether it was Legionnaires' disease years ago, SARS virus, pandemic flu a few years ago, Ebola in West Africa and Zika most recently, with every one of these diseases and outbreaks, we get more and more experience. Even within many established diseases, we continue see new serotypes or new strains emerge.

All of these things help you basically test your machine: How good were we with after-action reviews? How good were we at the detection, at the investigation, at the response? Every single day, WHO is dealing with dozens of alerts for which it has to undertake an initial verification,

A REGION IN CRISIS

A mural at the outskirts of Monrovia, Liberia, during the Ebola outbreak that affected thousands of Liberians in 2014 and 2015. Aylward was put in charge of the international response to the outbreak after earlier WHO efforts—hobbled by years of budget and staffing cuts—were criticized as tentative and inadequate. (U.S. Army photo courtesy of U.S. Army Corps of Engineers, Savannah District)

to understand did this actually happen or not, and then decide whether it requires an investigation, etc. So the machinery is getting tested every single day.

Army AL&T: Have there been any recent improvements in the machinery?

Aylward: Following the Ebola response, we had two big events just last year. One, of course, was the emergence of Zika virus in the Americas and beyond. And the second one, that's not recognized by as many people internationally but was a very, very alarming outbreak, was the big urban yellow fever outbreak in Angola and the Democratic Republic of the Congo last year.

These events happened as the new WHO Health Emergency Programme was being developed and rolled out. And the response was very, very different—the speed of the response—and the incident management system that was put in place after [the 2014 outbreak of] Ebola contributed greatly to the cross-organizational management of these Zika and yellow fever outbreaks in 2016. What we call our standard operating procedures for emergency management were operationalized, which got people on the ground faster, supplies out faster, etc. Another important improvement in the machinery was the work that had been done across what we call the Interagency Standing Committee, or IASC, which is convened by the emergency relief coordinator of the United Nations [U.N.] to coordinate the international response to major natural disasters and man-made emergencies.

In 2016, new protocols were developed so that the IASC would also deal with infectious hazards. So that piece of the machinery and the whole U.N. system kicked in more quickly. I have to say, the Ebola outbreak really brought new urgency to long-needed reform and improvements, not just within WHO and not just within its member states, but also within the whole international architecture that can be drawn on in such crises.

Army AL&T: How do you get all these organizations together and establish a common sense of readiness and motivation that brings them together to act efficiently and appropriately?

Aylward: The first thing that you've got to do is establish the necessary networks. WHO has been working for years to establish and support something called the Global Outbreak Alert and Response Network, which we're secretariat to. We're trying to tap all those great institutions like the U.S. CDC [Centers for Disease Control and Prevention], the E CDC [European Centre for Disease Prevention and Control], the Pasteur Institutes, the Public Health Agency of Canada, of China and of various other places, to create a network that can be used to provide international assistance in investigating and responding to infectious hazards.

Another network that we have set up is called the Emerging and Dangerous Pathogens Laboratory Network, which brings together leading laboratories at the international level that have the expertise to diagnose such pathogens safely and to put capacity on the ground, to do it locally if necessary. We are now developing new networks around emergency medical teams, health logistics, community mobilization and other aspects of response.

A second thing is getting these networks to common standards, language and processes. For example, with our emergency medical team network, we now have a standardized accreditation process which includes ensuring that they can operate with our incident management system.

The next thing, of course, is testing these networks and systems. Again, this is so familiar to any military. Simulations, simulations, simulations—you just can't do enough, whether it's desktop exercises, field exercises or other types of simulations across those networks and different players. The final thing, and probably one of the most important, is actually using real events to create joint responses, joint opportunities. We will often mobilize a network even in relatively small outbreaks to make sure that this network is doing almost "live-fire" exercises.

In the case of infectious hazards, we have another great tool at our disposal called the International Health Regulations. This is like an international treaty that has been agreed to among the 190-plus member states of WHO on how they will identify outbreaks, notify WHO, facilitate investigations, and manage or cooperate together in the response to certain dangerous and emerging pathogens and other hazards as well.

All of these mechanisms have challenges and have problems. But the big lesson we've learned is that none of these things work if you don't use them—you know, regularly test them and then rapidly operationalize them in crises. The problems are seldom the tools and the processes. It is more often just the sloth, let's say, or lack of resources that have led to their lying idle for too long.

Army AL&T: That gets to the point of when these networks that are so important need to be set up.

Aylward: I think our experience in Ebola was that we hadn't done enough of that in advance at some levels. We have to be clear: Even when you do look and plan ahead, you're not always going to get it right. That's why it's so important to do these after-action reviews and evaluations and then put in place the additional capacities, networks, etc., that are needed. And that will continue

A NEW ARCHITECTURE

Aylward, right, speaks in June 2016 at a briefing to the U.N. General Assembly on the report from then-U.N. Secretary-General Ban Ki-moon, second from left, on strengthening the global health system. "The Ebola outbreak really brought new urgency to long-needed reform and improvements, not just within WHO and not just within its member states, but also within the whole international architecture," Aylward told Army AL&T. (U.N. photo by Eskinder Debebe)

OPERATION UNITED ASSISTANCE

Liberian soldiers attach fencing at an Ebola treatment unit being built in support of Operation United Assistance in Gbediah, Liberia, in December 2014. United Assistance was the DOD operation to provide command and control, logistics, training and engineering support to U.S. Agency for International Development-led efforts to contain the Ebola virus outbreak in West Africa. (U.S. Army photo by Sgt. 1st Class Brien Vorhees, 55th Signal Company (Combat Camera))

Readiness really refers to being operationally ready to mount a response across a wide range of hazards, environments, and areas of different vulnerabilities and capacities.

to evolve over time as we come to understand hazards better, as we face new hazards and new crises.

We have to be open to learning these lessons. We learned the hard way that two gigantic networks that existed pre-Ebola weren't able to work together optimally. We had the public health network, a lot of which I just referred to, but almost completely separate from that were the humanitarian networks that dealt with natural disasters and conflict situations. And so one of the big pieces of work that we did last fall, working with OCHA, was the development of what we call the L3 protocols for infectious hazards: a new set of common protocols that would stretch across the public health and emergency worlds to deal with major new outbreaks.

Army AL&T: Did you work directly with the U.S. Army on Ebola?

Aylward: Although I became involved in the Ebola response as far back as March [2014], most of that early work was at the headquarters levels. I spent almost all of 2015 and much of 2016 on the ground in West Africa. Consequently I [personally] had less to do with the U.S. Army on the ground in the early days, but my teams did work with the U.S. Army, especially around the planning and then building of the Ebola treatment centers in Liberia

that would be needed if this thing were really to get out of control.

What was really impressive was that the Army was well-integrated into the civilian machinery that was actually running the response, and it was playing a role that was very well-appreciated. A number of our colleagues at CDC also reported a lot of support from the U.S. military on critical logistics, because getting to some of these infected areas was a real challenge—those Black Hawks came in real handy to rapidly get to some of the remote areas where they needed to immediately understand [the nature of the] disease.

I'm sure there were some problems that I didn't see in the civ-mil cooperation, but I really think we are moving in the right direction, which tends to be where I focus. I think we all came out of the Ebola crisis with a new, very much needed and very healthy respect for the capabilities, access and approaches of both sides.

Army AL&T: In the scale-up to the Ebola program, what did you see, and what did you prioritize in terms of what needed to be done first?

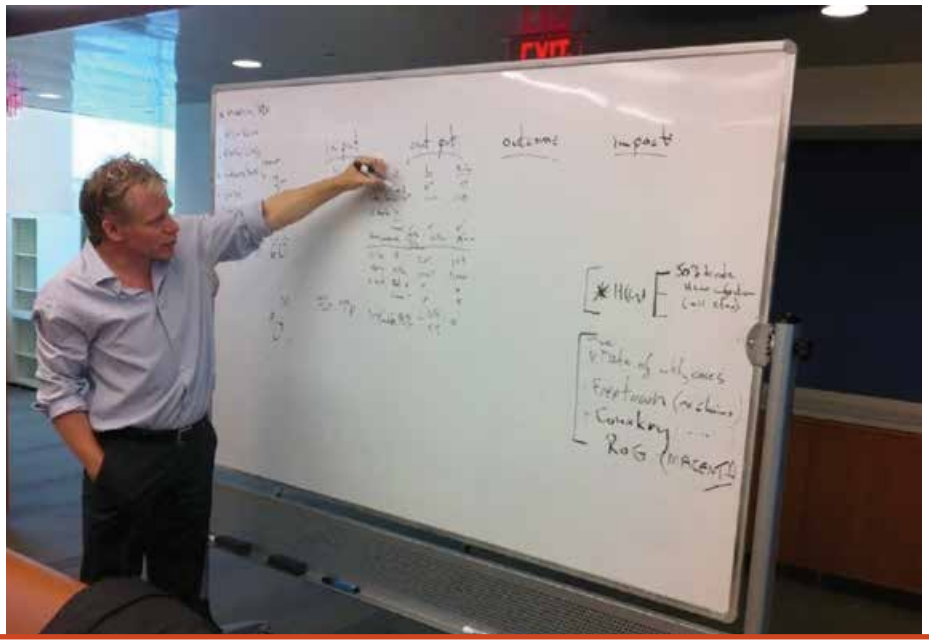
Aylward: I think the biggest single thing that I brought to the Ebola crisis was the combination of my understanding of epidemiology and disease eradication, as well as the world of humanitarian emergencies in which I worked. I could kind of bridge that gap across the humanitarian world, which mainly dealt with natural disaster response and conflicts, and the public health world that dealt with infectious disease emergencies. Because of that background, I could also translate what are sometimes complex epidemiologic and disease control principles into some very simple approaches that could help unite a massive number of players with very diverse backgrounds to a common purpose.

I remember taking a big whiteboard [in September 2014] on one of the upper floors of the U.N. in New York, and writing "70/70/60." I said, look, our goal, with all of these assets that we have, is to get 70 percent of the dead bodies carefully and quickly buried, and 70 percent of the infected people quickly into medical isolation, within 60 days. If we can achieve those two targets within the next 60 days, we will change the course of this epidemic and bend this exponentially growing epidemic curve.

I was really trying to take all that complex epidemiology and Ebola control knowledge and simplify it into something like 70/70/60, which was a clear, concrete goal. And that ended up being, certainly in that really scary period in the second half of 2014, what drove the international response.

Army AL&T: Is this a question, too, of your own personal leadership style?

Aylward: That's probably the most difficult question you've asked. Although all the people who have worked for me would probably say, "You must be joking," I tend to believe I have a very adaptive leadership style: from demanding control when necessary—when I, rarely, think it's very, very necessary—to providing a much more facilitative approach. I was described [in a December 2014 news



MAN IN CHARGE

Working with colleagues at the U.N.'s crisis control center in New York, Aylward lays out a strategy for getting the Ebola virus under control. Aylward had just been put in charge of WHO's Ebola operations and saw a need for a clear, concrete, unifying goal "in that really scary period in the second half of 2014." (Photo by Dr. David Nabarro, U.N. secretary-general special envoy on Ebola)

A PLACE TO GRIEVE IN SAFETY

A safe burial site for Ebola victims in Freetown, Sierra Leone. To marshal a diverse coalition of international partners to action, Aylward laid out a straightforward goal to slow the outbreak: get 70 percent of dead bodies buried, and 70 percent of infected people into medical isolation, within 60 days. Prompt, safe burial is important because the Ebola virus can be transmitted to family members preparing a victim's body for burial. (U.N. photo by Ari Gaitanis)

So we've got to be very careful about just saying, "Oh, it's unknown." We can build up pretty good risk profiles.

article] as taking charge of our [Ebola] response like a general. But that makes people think of a command-and-control approach. I think my approach is much more to enable and facilitate really good technical people to be able to have the amazing impact that they can by freeing them from whatever is holding them back, whether that's administrative, managerial, political barriers or whatever.

I do have a certain capacity or inclination to be able to take complex ideas and problems and break them down quickly into manageable and understandable approaches and interventions, and then be able to mobilize—probably with a lot of energy—our troops behind them. But in terms of a single descriptor, I think I've had to be a very different leader in very different situations, and what I've tried to do is adapt the style to the context and challenges.

Army AL&T: Well, it's precisely the bigness of the things you've taken on that led us to you. What's your motivation? What's your attraction to these huge problems?

Aylward: Well, it's funny—I've usually had these problems thrust on me. I don't remember actually applying or asking to do any of those things. But the big motivator has always been the unequal access that I've seen and continue to see [to] some really basic health services. It's really what motivates me, gets me out of bed every day. When I ran the polio eradication initiative, I remember one of my

THE LITTLEST VICTIMS

Visiting a particularly hard-hit area of Guinea in April 2015, Aylward talks with children orphaned by Ebola. Many of them had lost both parents to the disease, and some had lost all of the adult caregivers in the family. Local authorities took on the responsibility to provide for their basic needs, with support from nongovernmental organizations and U.N. agencies. (Photo by Katherine DeLand, WHO)

good friends who was part of my management team would sometimes come to my office about 8 o'clock at night, close the door and ask, "Will you remind me again why are we still doing this?" "Because we haven't reached all the kids." It's as simple as that.

I have one kid. He's got all his vaccinations. He's got all of everything. And, you know, a lot more kids could get a lot more of everything if we had the determination and smart, committed people working to ensure that were the case. It's just getting the enlightened, hardworking [people] in the positions to be able to lead that way.

Army AL&T: This is a sort of a more cosmic question: Is there anything to be learned from epidemiology and its mission about organizational change, about how ideas and practices can be made contagious?

Aylward: I thought your last question was the most difficult one. It's probably this one. When you think about epidemiology, it's really about looking at the drivers that make a disease behave the way it does in a population. What are the causes and the drivers and other factors? And how can you influence those factors to [obtain] better outcomes?

When you look at big change processes, people often think it's about making institutional changes and structural changes, but it's not. It's about people, right? You need to get a group of people moving in a different direction. To do this you have to understand the drivers behind their behaviors, and then you've got to figure out what levers you can pull, just like the different [disease] control measures you could pull to be able to effect a very different outcome in a particular population.

It's a funny way to look at change, and probably something I do without even realizing it. Too often when we think about changing organizations, we think about what kind of business does it do? How do we restructure it to deliver that business? How do we change its processes, etc.? That's all important, but the real change comes when the people change and they say, we want to achieve those kinds of results and we want to change the way we work to achieve those results. That means changing the direction of a population and being able to effect the right drivers to do it.

So I guess there are things to be learned from epidemiology and its focus on data and a systematic and scientific approach. With organizational change you've got to be systematic, data-driven, etc. But, at the same time, the one thing that isn't there in epidemiology that's got to be there in any kind of a change process is a very clear vision of a better future for an organization and its population. That really is at the heart of change; that's the big driver, right? And that's got to be there.

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AN EYE ON INVENTORY

An M1A2 Abrams tank crew completes tank gunnery qualification at Presidential Range in Swietoszow, Poland, in January. The arrival of the 4th Infantry Division's 3rd Armored Brigade Combat Team in Poland marked the start of back-to-back rotations of armored brigades in Europe as part of Atlantic Resolve. While the stockpile of flame-resistant combat uniforms satisfies the demand for deploying Soldiers such as these, it would be insufficient to support a surge, of the sort Atlantic Resolve aims to prevent by demonstrating U.S. commitment to European stability, for a large-scale conflict in the Middle East, Asia or Europe. (U.S. Army photo by Staff Sgt. Micah VanDyke, 4th Infantry Division Public Affairs)

BEEN THERE, DONE THAT
THINK READY, BE READY

What if multiple brigades of deploying Soldiers suddenly needed combat uniforms? Meeting challenges such as this one, strategically and creatively, before a conflict arises is the true test of readiness for Army acquisition.

by Dr. Robert F. Mortlock, Col., USA (Ret.)

In late 2004, at a town hall with Soldiers deployed to Southwest Asia, then-Secretary of Defense Donald H. Rumsfeld responded to Soldiers' questions about the availability of vehicle armor by saying that they had to go to war with the Army they had, not the one they wanted. The backlash from Soldiers, Congress and the American public was intense—they questioned the Army's commitment to readiness and its budget priorities. As a result, the Army changed priorities and increased its investment in force protection by supplying critical combat equipment, including flame-resistant uniforms, to Soldiers deploying overseas to combat zones.

Fast forward to 2017, and the 39th chief of staff of the Army (CSA), Gen. Mark A. Milley, has made readiness the Army's top priority. How does this affect the business of acquisition? How do Army acquisition leaders meet the CSA's intent? Achieving readiness will require a hard look at acquisition timelines and methods. Simply put, it takes a changing mindset that prioritizes readiness in acquisition decisions. As of 2017, for example, the stockpile inventory of flame-resistant combat uniforms satisfies the demand for deploying Soldiers but is insufficient to support a surge deployment of Soldiers for a large-scale conflict, were one to arise in the Middle East, Asia or Europe.

Army acquisition leaders need to fight through the Army's bureaucracy, including its risk-averse and change-resistant culture, to meet the CSA's intent. Having an adequate stockpile of flame-resistant combat uniforms to support deploying Soldiers for a major regional conflict directly supports the CSA's goal of improved readiness and is just one area that requires innovative acquisition approaches.

Achieving readiness will require a hard look at acquisition timelines and methods. Simply put, it takes a changing mindset that prioritizes readiness in acquisition decisions.

THINK LONG TERM

The traditional approach is to develop evolutionary acquisition strategies based on incremental development—that is, deliver a limited capability to the warfighter early on, then the full required capability later. In the case of a flame-resistant combat uniform shortage, this approach is not applicable because the procurement, production, storage and fielding of flame-resistant uniforms for a large-scale deployment on the order of tens of brigade combat teams (BCTs) is not a development program.

Alternative acquisition approaches can leverage lessons learned to solve the shortfall by applying existing processes in innovative ways. To ensure readiness with sufficient quantities of flame-resistant combat uniforms for deploying Soldiers, it is essential that the Army make a long-term commitment by maintaining a production capability and capacity that can meet surge requirements.

Fortunately for the Army, the Rapid Fielding Initiative (RFI) currently provides all deploying Soldiers with the necessary combat uniforms and equipment to operate successfully on the battlefield. However, the RFI program is funded from the overseas contingency operations (OCO) account, whose annual budget is based on the predicted number of deploying Soldiers.

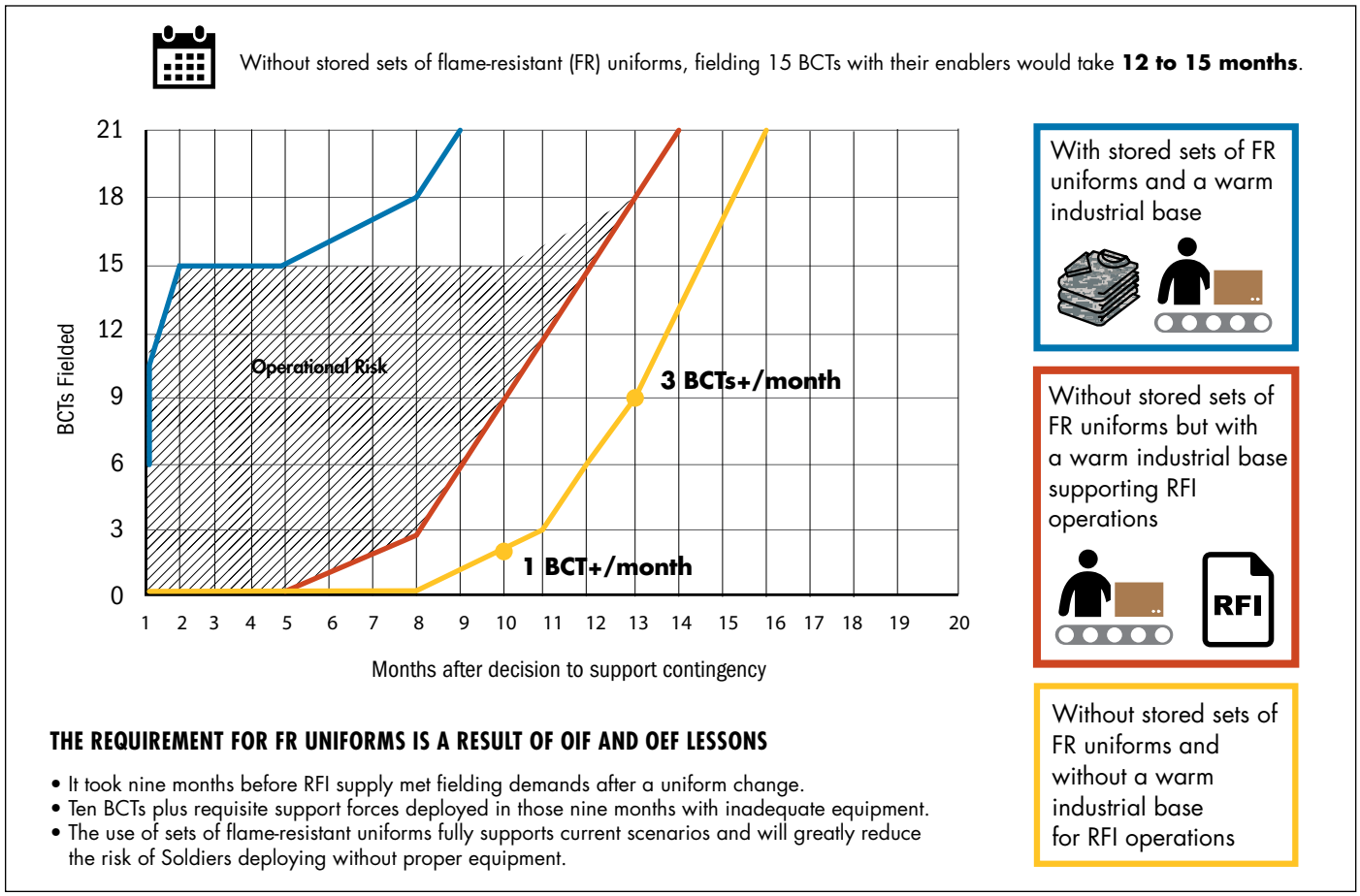
Basically, the program procures sufficient flame-resistant uniforms at the beginning of the fiscal year to support that year's deploying Soldiers. However, the number of deploying Soldiers has dropped from a peak of around 190,000 Soldiers in FY08, at the height of Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF), to current levels of about 15,000 Soldiers. Therefore, the RFI is procuring fewer flame-resistant combat uniforms each year.

As an example, based on a deployment of 15 BCTs, the Army would need about 12 months to build the inventory of flame-resistant uniforms and field them for all deployed Soldiers. This projection is based on the current industrial base, which is severely limited by the requirement to buy U.S. products in compliance with the Berry Amendment; on the existing contracts; and on the demonstrated capabilities from the introduction of the Army Combat Uniform (ACU) with the Universal Camouflage Pattern in 2005 for OIF and the introduction of the Flame Resistant Army Combat Uniform (FRACU) in the OEF Camouflage Pattern in 2011. Soldiers would deploy with the current issued uniforms, which are not flame resistant, and get

FUELING NEW APPROACHES

Sgt. Jacob Girardin, a refueler from the10th Combat Aviation Brigade (CAB) of the 10th Mountain Division, fuels a Finnish air force F-18/A Hornet at Lielvarde Air Base, Latvia, in May. Deploying Soldiers recieve the FRACU and the FREE through Rapid Fielding Initiative operations; currently, Soldiers wear the ACU in garrison, but one option to boost the numbers of combat-ready uniforms available would be to issue a single set of combat-ready uniforms that Soldiers wear in garrison and overseas. (U.S. Army photo by Spc. Thomas Scaggs, 10th CAB)

FIGURE 1



READY FOR TROUBLE?

To ensure that there are sufficient quantities of flame-resistant combat uniforms for deploying Soldiers, the author recommends that the Army maintain sufficient production capacity and supplies to meet surge requirements. (Graphic by U.S. Army Acquisition Support Center (USAASC))

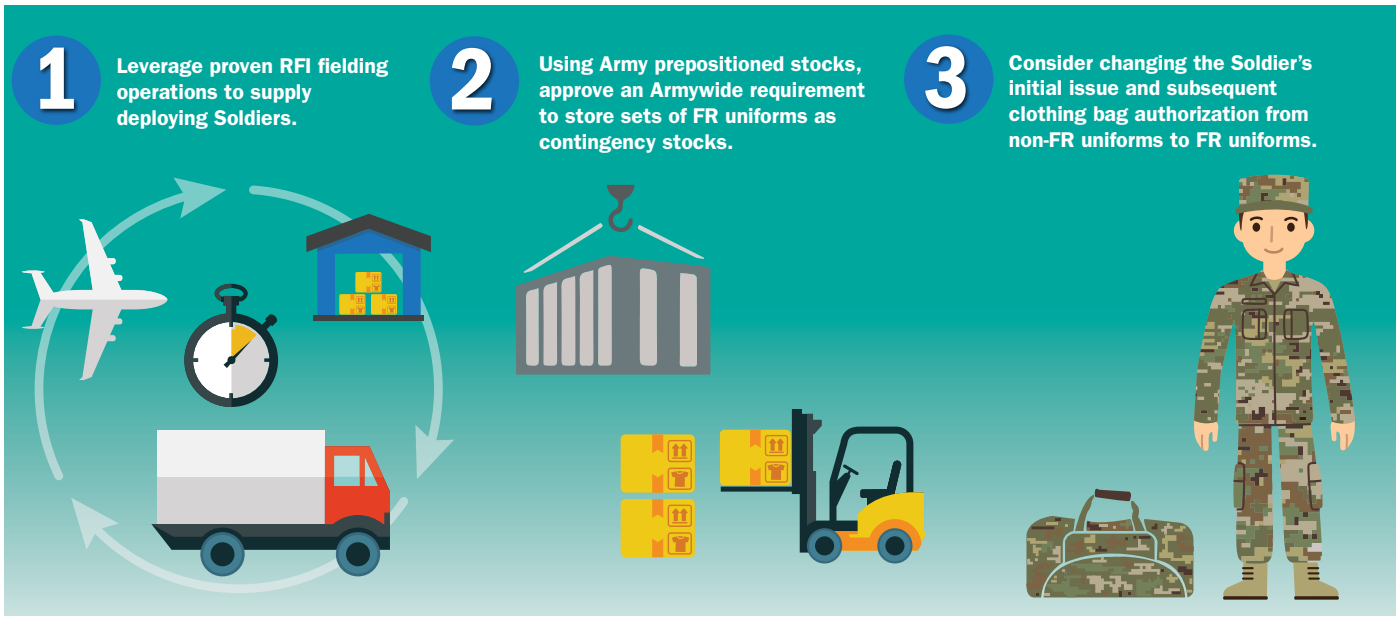
the flame-resistant versions to meet this surge requirement after the industrial base ramps up production and the Army builds up its inventory. (See Figure 1.)

This is an unacceptable solution that runs counter to the CSA's readiness priority. After introducing the ACU in 2005, the Army recognized the importance of protecting Soldiers from battlefield hazards and included specific uniform requirements for protection against insects (resulting in permethrin treatment) and fire or flame (resulting in flame-resistant fabrics). The ACU fabric is a 50-50 mix of cotton and nylon. The FRACU is made of 65 percent rayon, 25 percent para-aramid and 10 percent nylon. The Flame Resistant Environmental Ensemble (FREE) is the flame-resistant version of the seven-layer Generation III Extended Cold Weather Clothing System (ECWCS).

When Soldiers deploy to combat today, they are issued both the FRACU and the FREE through Rapid Fielding Initiative operations. Soldiers do not normally deploy with the clothing bag-issued ACU and ECWCS—those are for daily wear in garrison operations and in training.

With close to a decade's worth of evidence on the benefits of flame-resistant combat uniforms, namely reduced combat injuries from burns, it would be unacceptable for Soldiers to deploy to future combat operations in non-flame-resistant uniforms.

FIGURE 2



THREE WAYS TO GO

The author says the Army has three options for buying time for the industrial base to ramp up production of flame-resistant uniforms to meet requirements for a possible 0leaving Soldiers unprepared for combat is unacceptable. (Graphic by USAASC)

That would take the Army to a lower state of readiness and force protection. However, that is exactly what could happen this year if the Army does nothing to anticipate the surge requirement for flame-resistant uniforms for Soldiers deploying in support of a major conflict.

ACTION NOW = READINESS LATER

Are there better acquisition approaches for the Army to consider? Yes, and now is the time to act—before there is an actual need for hundreds of thousands of deploying Soldiers. Current RFI operations efficiently support deploying Soldiers with flame-resistant uniforms. At the same time, current central issue facilities and military clothing and sales stores across Army installations support Soldiers with non-flame-resistant uniforms. This period of sustained excellence is the time to plan and prepare the industrial base to support a surge requirement for flame-resistant uniforms. Each of the following three options has advantages and disadvantages, but with overall benefits far exceeding the costs of the unacceptable status quo. The Army must be able to buy time for the industrial base to ramp up production and meet surge requirements for flame-resistant uniforms. (See Figure 2.)

Option 1—Leverage the efficiency and excellence of current Rapid Fielding Initiative operations. Over the last decade, RFI has successfully fielded millions of items to deploying Soldiers. The current operation can simultaneously support the fielding of flame-resistant uniforms and combat gear for up to three brigade combat teams per month. The RFI could seamlessly absorb a mission supporting 15 BCTs' worth of uniforms by simply adding that much buffer-stock inventory of flame-resistant uniforms to the central warehouse in Lansing, Michigan. The storage, distribution, transportation and fielding operations for these uniforms would operate similarly to current RFI operations.

The barrier to implementation is not affordability but a change-resistant Army culture. Current RFI operations are 100 percent OCO-funded, and this option would require the Army to acknowledge the long-term benefit of RFI operations and make the RFI an enduring requirement with a commitment to fund at least part of the program's operations from the base budget—essentially institutionalizing that portion of the RFI. As a possible model, the Army successfully institutionalized the

Rapid Equipping Force (REF) by approving it as an enduring need and including the REF in its base budget requests.

Option 2—Consider this surge requirement for flame-resistant uniforms as a concept similar to Army prepositioned stocks (APS), whereby the Army would approve the requirement to store sets of flame-resistant uniforms as contingency stocks. The APS is a multifunctional set of equipment for a BCT or more, stored at a forward location in preparation for conflict in that region. Similar to APS operations, in times of need, the flame-resistant uniforms would be taken out of storage and fielded to deploying BCTs. The Army already has implemented this concept successfully, albeit on a smaller scale, for units of the 82nd Airborne Division at Fort Bragg, North Carolina, that are supporting the Global Reaction Force. The Marine Corps implements a similar storage concept for flame-resistant uniforms to support deploying Marines.

The U.S. Army Maneuver Center of Excellence, the Army Capabilities Integration Center and the Program Executive Office for Soldier proposed a similar concept called deployer equipment bundles (DEBs). A validated cost-benefit analysis performed on the concept in 2014 concluded that the benefits of having flame-resistant uniforms stored for future contingencies outweighed the costs. Basically, it is less expensive for the Army to store and eventually field the uniforms than it is to field flame-resistant uniforms and then sustain them for Soldiers.

Again, the barrier to acceptance and implementation is an Army culture that's reluctant to consider change, as well as the lack of a system to properly prioritize funding across program evaluation groups (PEGs), which are responsible for DA program and budget funding. A DEB-like concept for flame-resistant uniforms would call for a base budget requirement, but the Army can't work through its own bureaucracy to determine if the equipping, sustaining, training or manning program evaluation groups should cover the bill. Essentially, no single PEG will champion the concept because they fear they will be forced to pay the entire bill. Additionally, the Army is reluctant to fund the procurement and storage of flame-resistant uniforms with base budget funding without a requirements document approved by the Joint Capabilities Integration and Development System (JCIDS)—a fundamentally ridiculous situation, given that the Army has been buying and fielding flame-resistant uniforms to Soldiers for a decade with OCO funding and no need for JCIDS approval.

To get a capability production document validated and approved just for the sake of securing funding would take years. This cumbersome approach is an example of the fundamental disconnects between the JCIDS, the acquisition system and the planning, programming, budgeting and execution processes—the same disconnects that are the root cause of most acquisition program failures.

Option 3—Supported by both Congress and industry, this option calls for the Army to consider changing the Soldier's initial issue and subsequent clothing bag authorization from non-flame-resistant uniforms to flame-resistant uniforms. At a minimum, the Army could consider authorizing and issuing a mix of non-flame-resistant and flame-resistant uniforms for all Soldiers. This option would allow Soldiers to train in flame-resistant uniforms, giving them the same force protection benefits during garrison operations and training exercises that they get in combat. The uniforms then would be available for deployments, immediately and visibly increasing readiness.

The primary barrier to implementation of this option is affordability. The current cost of a set of ACU blouse and trousers runs about $90, while specialized and flame-resistant uniforms are significantly more expensive. The ECWCS costs $800, the set of FRACUs runs about $175 and the FREE about $2,300. Therefore, this option would increase the costs for initial issue and the clothing replacement allowance for Soldiers. Additionally, these bills would be absorbed by the manning and sustaining PEGs from already overextended personnel as well as operating and support accounts.

The risk of deploying Soldiers to combat without flame-resistant uniforms is too great to allow concerns of affordability and resistance by the bureaucracy to outweigh the benefits to Soldier readiness.

FEWER SOLDIERS DEPLOYED
U.S. Army 82nd Airborne Division Soldiers, deployed in support of Combined Joint Task Force – Operation Inherent Resolve, greet Iraqi army troops in June in a Mosul neighborhood liberated from the Islamic State group. With the number of deploying U.S. Soldiers down to around 15,000 from a peak of about 190,000 in FY08, the Rapid Fielding Initiative is procuring fewer flame-resistant combat uniforms each year. (U.S. Army photo by Staff Sgt. Jason Hull, 82nd Airborne Division Public Affairs)

CONCLUSION

The bottom line is that the Army cannot afford to take Soldier readiness for granted. Issuing Soldiers flame-resistant uniforms or having a stockpile of flame-resistant uniforms available would increase readiness and force protection.

Any of the acquisition strategies presented above would allow the Army to provide first-deploying Soldiers with flame-resistant uniforms and give the industrial base time to ramp up production for follow-on deploying Soldiers. There's enough money in the Army's total obligation authority and budget to support any of these options—it's just a matter of understanding the CSA's intent and getting through the bureaucratic barriers to implement innovative acquisition approaches.

The risk of deploying Soldiers to combat without flame-resistant uniforms is too great to allow concerns of affordability and resistance by the bureaucracy to outweigh the benefits to Soldier readiness. Having a useful, innovative readiness plan for the flame-resistant uniforms goes beyond this particular case. It is also an example of how acquisition leaders can attain a much-needed readiness mindset that looks around, through and over the bureaucratically inclined culture of risk aversion with a determination to keep Soldiers properly equipped above all other considerations—providing an uncommon but vitally important unity of enduring acquisition values, day-to-day practice and current Army priorities.

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URGENT NEED: SENSIBLE REQUIREMENTS

Instead of KISS (keeping it super simple), requirement writers for ACAT III programs often go to absurd lengths to document what a product should do—even when the product is already sitting on a shelf. Here's how to write a requirement—and a better way based on the author's doctoral dissertation.

by Dr. Donald Schlomer, Lt. Col., USA (Ret.)

To understand requirements, you first have to understand the concept of a "capability," which simply means something that can do something. Whether it's a high-tech jet that can take off vertically and reach the outer atmosphere in seconds or a lowly boot made for extended jungle wear that won't encourage trench foot, someone has to describe what is required of each before you can have either.

Closer to home, think of your fridge as a capability—a way to keep food from spoiling using refrigeration. Simple, right? For an Army requirement writer, it's a different story, especially if the capability is an entirely new one.

What should the refrigerator be, other than an insulated box that keeps food and drink cold? What should its capacity be in cubic feet? How many, if any, compartments should it have? Should it have a freezer? What range of temperatures is acceptable for food freshness? What level of humidity? What about efficiency and noise? What specific voltage and amperage should power it? What are the environmental rules and regulations that surround it? Is efficiency more important than, for example, speed of cooling? What should the box be made of? What kind of insulation? What kind of motor and compressor?

That might seem like excessive detail, but it just begins to scratch the surface of the amount of information required to define a capability that the Army needs.

While the Army buys some of its capabilities as commercial off-the-shelf (COTS) products, a good many of its required capabilities necessitate defining specifications from scratch, essentially turning someone's vision into reality. Often, that's reality-by-committee, because the requirements necessary to bring a capability into existence are based on the input of the capability's stakeholders—anyone who would be involved with using, contracting, acquiring, testing, fielding or disposing of the capability.

So, when DOD decides it needs a capability, someone must develop a capability development document (CDD). The CDD must define the capability for Congress and, by extension, taxpayers and all stakeholders. Accordingly, the CDD defines the requirement as to what to purchase.

GENESIS OF REQUIREMENTS

A capability requirement starts when Army leadership agrees that a military need exists and approves the need by signing a capabilities-based assessment (C-BA) document. The C-BA for the jungle boot, for example, was approved in 2012. The Army has not had a certified jungle boot since the end of the Vietnam War. This C-BA allowed for multiple facets of the Army leadership to agree on the need to acquire the jungle boot, with estimated cost. Based on that cost, the C-BA was assigned an acquisition category (ACAT) number. ACAT I programs are the high-priced items, such as tanks, ships and airplanes, with program costs of more than $2.79 billion. ACAT II programs have program costs between $835 million and $2.79 billion. ACAT III programs have costs below $835 million.

THE ETERNAL PROCESS

For Sisyphus, the Greek mythological figure who was condemned for eternity to push a boulder up a hill, only to have it roll back down as he neared the top, eternity was a very long time. For those developing ACAT III requirements, the process only seems like an eternity. (Image by U.S. Army Acquisition Support Center)

In the real world, when you decide you need something, you go out and get what your budget will allow. Sometimes that may entail a conversation with a spouse or significant other—a stakeholder—to make certain that everyone agrees that the purchase of a new pair of boots, for example, is justifiable and within budget. Such a conversation is nothing compared with what military personnel have to go through to obtain stakeholder approval to acquire a new capability.

To start, a Center of Excellence (COE) requirement writer within the U.S. Army Training and Doctrine Command (TRADOC) develops a C-BA. The COE could be one of several established by branches of the Army. The C-BA for the jungle boot was assigned and completed by a requirement writer within the U.S. Army Maneuver Center of Excellence (MCOE) at Fort Benning, Georgia. A C-BA contains a cost-benefit analysis that estimates the cost and value of developing, fielding, maintaining and disposing of a capability.

With the approval of a C-BA for a jungle boot, MCOE personnel develop the CDD that provides the requirements for it. What general specifications and efforts are required to obtain, field, train for, maintain and dispose of the jungle boot?

To recap quickly:

- The C-BA establishes that what the military needs is actually a boot—not, for example, a different way of wearing an existing boot.

IF THE SHOE FITS
Soldiers assigned to the 3rd Brigade Combat Team, 25th Infantry Division (3-25 BCT) try on jungle combat boots at East Range on Schofield Barracks, Hawaii, in March. Fielding a new jungle boot is a long, cumbersome process—and one that could be improved significantly by following the author's approach. (U.S. Army photo by Staff Sgt. Armando R. Limon, 3-25 BCT)

- The C-BA establishes that the benefit of the jungle boot is worth the cost.
- The CDD establishes requirements needed not only to develop the jungle boot but to maintain, field, provide training and dispose of it.

A SLOW PROCESS

The Joint Capabilities Integrated Development System (JCIDS) started in 2003 to provide a process by which military leadership can validate capabilities and, through the approval of a CDD, try to ensure that a product acquired by one branch of the military can interface with a product in another branch of the military. For example, if the Army wanted to purchase a radio by submitting a CDD, the JCIDS approval process would try to ensure that, before the Army purchased that radio, it would interface with an existing Navy radio. Once the CDD is approved, it is given to a program or project manager (PM) somewhere within the Defense Acquisition System who is responsible for developing the contract to acquire the capability that the CDD identifies.

Step 1: In the first step in JCIDS, the requirement writer establishes an integrated project or product team (IPT). An IPT usually has between five and 15 members. (See Figure 1, Page 116.) The team members should be key stakeholders associated with the jungle boot, and each member should provide advice on how the CDD should be written. The knowledge and experience of the stakeholders are vital to the approval of the CDD.

Creating a good stakeholder IPT reduces the time needed to write and obtain approval of the CDD. An IPT should include enough members to generate a good CDD without taking years. An experienced requirement writer who understands the capability should decide how many stakeholders—not too few and not too many—will form the IPT. (Unfortunately, this was not the case for the jungle boot. See "The Jungle Boot" in the April – June 2017 issue of Army AL&T magazine.)

Step 2: The second step in writing the CDD is to understand but not question the need for the capability. IPT members address all

FIGURE 1

KEY

ACAT: Acquisition category
AMC: U.S. Army Materiel Command
ARCIC: Army Capabilities Integration Center
AROC: Army Requirements Oversight Council
ATEC: U.S. Army Test and Evaluation Command
COEs: Centers of Excellence
PM: Program or project manager
RDECOM: U.S. Army Research, Development and Engineering Command

NO SHORTAGE OF STAKEHOLDERS

The JCIDS requirement document development is supported by several stakeholders and elements. The Army G-8 and G-3 are the Army Requirements Oversight Council approving authority, and the program executive office or PM serves as the acquisition executive. Requirements are written by the Army Centers of Excellence, and the U.S. Army Test and Evaluation Command serves as the testing agency. The Army Capabilities Integration Center is the gatekeeper of the requirement documents, and the U.S. Army Materiel Command is the maintenance executive. (SOURCE: "Strategies for Exploring: ACAT III Requirement Approval Process," by Dr. Donald Schlomer)

In the real world, when you decide you need something, you go out and get what your budget will allow. Sometimes that may entail a conversation with a spouse or significant other. … Such a conversation is nothing compared with what military personnel have to go through to obtain stakeholder approval to acquire a new capability.

facets of the CDD requirement in writing, starting with the specifications. For the jungle boot, for example, the specifications include a sole (tread), a tongue, straps (laces), sizes, color and fabric. Discussion of the sole and fabric might concern the amount of traction for the tread and the type of fabric, such as water-resistant and fast-drying. The specifications must be objectively testable, which means that the requirement needs to state that the boot must be water-resistant as defined by the ability to repel water for up to 20 minutes. An example of fast-drying would be the ability to dry in four hours in an 80-degree environment.

When coming up with specifications, requirement writers should always take the KISS approach—keep it super simple. (There are several other ways to define KISS, but all of them mean the same thing.) The specification may vary depending on the product, but usually it takes no more than two years to complete. Despite being a widely accepted design principle, KISS is applied far too infrequently in CDDs.

Step 3: Next is defining the quantity and effect across the Army—which units and how many Soldiers actually need the capability defined in the CDD. The quantity is derived from the number of units that will need the item and how many per unit will be needed. The effect refers to the possible changes in standard operating procedures or possible impacts on tactics, techniques and procedures resulting from the use of this product. For example, every Soldier in every unit could wear a jungle boot, but do they all need to be wearing them?

Step 4: Next, the CDD must address maintenance and disposal. For the boot, cleaning instructions include the type of soap and the type of utensils to use. The maintenance should include any

requirement to repair the boot. Similarly, the requirements must include a definition of how worn the boot should be before the Soldier can turn it in for replacement.

Step 5: The CDD also must identify key performance parameters (KPPs) or key system attributes (KSAs) that a vendor absolutely must meet. For example, a KPP could be boot drying time. A KSA may be the color of the boot, such as brown. Therefore, tan, sand or khaki may be acceptable. Army leadership does not make fashion statements and doesn't care if the boots match the uniform. But leadership does care if the boot achieves the requirement to support the warfighter.

ABSURD LENGTHS

For all ACAT programs—tanks, ships and boots—CDDs are restricted to a maximum of 45 pages. In researching my doctoral dissertation to develop a strategy to accelerate the approval time of an ACAT III program within the JCIDS process, I found that virtually all of the CDDs in my research, regardless of the complexity, had a page count of 45.

For ACAT IIIs, the ideal page count should be no more than 10 pages. Overly prescriptive requirements make the process harder—not only for the requirement writer but for the contractor who eventually will produce the product. They also slow the delivery, increase cost and inhibit creativity.

Helpful hint: Since all products must have a CDD, it makes sense when developing one for a COTS product to have the CDD's wording reflect the actual capabilities of the product. Leveraging the established capabilities of the COTS product should make the description in the CDD shorter and easier to develop.

Once the CDD is approved, it's the PM's responsibility to develop a contract to acquire the capability. The PM shop will develop a document called the capability production document (CPD) to develop the acquisition and contracting strategy, which includes the type of contract to be used (firm fixed-price, cost-plus or best value) and the request for proposal (RFP). The RFP will include the parameters by which proposals will be evaluated.

The CPD defines the specifications of the capability or product the PM is contracting to acquire. If the PM representative is an initial stakeholder, the development of the CPD can happen while the CDD is being approved. Months, if not years, can be saved if all the stakeholders work together simultaneously to develop a CDD and a procurement document such as a CPD.

CONCLUSION

A sensible question to ask is, "How long should it take to acquire a capability like a jungle boot?" Jungle boots currently exist in the commercial market—as a COTS product—that meet most if not all of the Army's requirements. Thus, anyone can order a pair online and have them delivered within a week.

Does it make sense that it has taken more than four years to deliberate about the acquisition of a jungle boot through the JCIDS process? Why spend over a year writing a lengthy CDD, wait 120 days for approval and devote an additional 18 months to contract, just to acquire something that's already commercially available? If the document writer can produce a CDD that is 10 pages or fewer and the CDD is understood by all stakeholders, that time frame and the entire acquisition process will improve.

Based on examples of approved CDDs that I reviewed, I developed the "approval time formula." The formula takes into consideration six different factors that include the ACAT category, the cost of the program, priority and the risk of the project. Army management can use this formula to develop objective metrics to track the program approval process and apply emphasis when necessary.

Will the time to deliver a COTS product ever be reduced to a week? I think not. However, delivering a COTS product such as a jungle boot within two years is very much within reach.

*For more information, contact the author at **DonSchlomer@gmail.com** or 813-826-1353; or go to **https://www.dau.mil/tools/t/Manual-for-the-Operation-of-the-Joint-Capabilities-Integration-and-Development-System/**. (A Common Access Card is needed to log in.)*

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GATEWAY TO THE SKIES

The DOD Enterprise Satellite Gateway at Fort Detrick, Maryland, features the large strategic satellite terminals installed as part of PM DCATS' Modernization of Enterprise Terminals Program. Though Stein had no background in satellite communications, he was charged with leading a team of engineering, contracting and logistics personnel to ensure that wideband satellite coverage is available whenever and wherever Soldiers need it. (Photo by James Christophersen, PM DCATS)

PM PERSPECTIVE
COL. CHARLES M. "CHARLIE" STEIN

COMMUNICATIONS READINESS: 'CAN YOU HEAR ME NOW?'

by Mr. James Christophersen

This column is the first in a new Army AL&T series, PM Perspective, which looks at acquisition from the viewpoint of the program, project or product manager. These are big programs—generally acquisition category I and II— not only in terms of their importance to the Soldier, but also in terms of sheer dollars. How do PMs deal with the complexity of the teams that staff these programs? What do they wish they'd known then that they know now? What lessons can other PMs take from their experiences?

Col. Charles M. "Charlie" Stein started his military career as a U.S. Marine Corps infantryman and mortarman. Spending six-month stretches on a flat-bottom boat in the South China Sea made land-based services look very appealing, and in 1990 Stein was commissioned as a second lieutenant in the Army Quartermaster Corps. Stein has been the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command Technical Center deputy director, product manager for Ground Combat Tactical Trainers, and project director for the National Training Center at Fort Irwin, California. He relinquished his charter as the project manager for Defense Communications and Army Transmission Systems, part of the Program Executive Office for Enterprise Information Systems, in August 2017 and is now director of fires for the assistant secretary of the Army for acquisition, logistics and technology.

His education includes an M.S. in management from the Florida Institute of Technology. He has been an educator as well, as course director for the Army Acquisition Foundation and the Army Intermediate Program Management courses at the Army Acquisition Center of Excellence and as assistant professor of military science at Seton Hall University. He is a member of the Ordnance Order of Samuel Sharpe, Military Order of Saint Martin, the U.S. Army Space Professionals Association's Order of St. Dominic and the Signal Corps Regimental Association's Order of Mercury.

Tucked away in a nondescript, temporary building on a corner of Fort Belvoir, Virginia, sit the offices of the Project Manager for Defense Communications and Army Transmission Systems (PM DCATS). Here, more than 200 men and women of the Army Acquisition Workforce manage more than $875 million for 30 strategic satellite and terrestrial communications systems.

Communications satellites orbit more than 22,000 miles overhead, invisible to the naked eye, 24 hours a day, 365 days a year. The average person does not give a second thought to the modern marvel of satellite communications (SATCOM). Although the U.S. Air Force enjoys responsibility for the headline-grabbing launches, the satellites would be little more than multimillion-dollar space junk without the terrestrial infrastructure in place to communicate with them. It's the Army's software and land-based control centers that command

the communications payload on these satellite constellations, and the payload ensures that Soldiers have dedicated communications coverage wherever they go out on a mission.

As the PM for DCATS, Col. Charles M. Stein had a lot to do with making this happen. The systems he managed enhance the readiness of virtually all of the military's wideband SATCOM capacity, which supports U.S. combat forces deployed around the globe. The PM's objective: to ensure that the DOD wideband satellite constellation continuously provides support to peacetime, contingency, surge and crisis action plans. It is the very definition of SATCOM readiness.

ONLY CONNECT

Stein thanks Soldiers from the 3rd U.S. Infantry Regiment, "The Old Guard," Alabama National Guard and Arizona National Guard for their work verifying the preparedness of the CSS VSAT system for transition to Soldier sustainment from contractor logistics support, March 3, at Aberdeen Proving Ground, Maryland. Stein's first move as PM was to assess morale through a survey and smaller sensing sessions, and then to act on the feedback gathered with policy and personnel changes. (Photo by James Christophersen, PM DCATS)

A SYSTEM OF SYSTEMS AND PEOPLE

Gen. George S. Patton said, "If everyone is thinking alike, then somebody isn't thinking." That is a good encapsulation of how Stein manages PM DCATS' collective brainpower. The team's diversity—in background, personality and perspective—includes satellite engineers, contract specialists, logistics personnel and program managers, all assembled under one roof at Fort Belvoir. Each member brings a distinct skill set and expertise to the organization, and bringing them all to the same table has its own value.

Stein's three-year tenure as PM DCATS started and ended with people, he said. His first goal at DCATS was to address morale. "When I arrived, we launched a climate survey, which revealed clear places for improvement," he said. One such area was Stein's effort to help make people feel safe to voice unpopular or critical opinions. "We followed up the climate survey with a series of small-group, non-attribution 'sensing sessions' where five to 10 people met with me at a time to air their grievances. The sensing sessions in particular really opened the floodgates, revealing some major issues," he said.

More important to Stein, PM DCATS then followed up on the survey and sensing sessions, changing policies and personnel where necessary and instituting a number of training and team-building efforts. That Stein took concrete action to make real changes driven by those opinions reinforced that he was taking people seriously and affirmed the trust they had placed in him. Another climate survey in July 2017 showed a 40 percent improvement in morale.

Although Stein's background is in teaching and acquisition, which are not even distant relatives of the signal or SATCOM professions, a PM doesn't have to be the expert on every aspect of their program. "I rely on our satellite experts to guide the Army toward smart decisions," said Stein. "They rely on me for the acquisition acumen to navigate the treacherous waters of Army acquisition. Only together does DCATS succeed. It's all about getting everyone to see the benefit of all of us rowing together."

A VARIETY OF CUSTOMERS

PM DCATS' stakeholders, especially its customers, "are as varied and diverse as our workforce and portfolio," said Stein. The office serves more than 45 different customer organizations as diverse as major commands, HQDA and special operations forces, not to mention joint force partners and international allies. (See "PM DCATS Programs and Dependencies," Page 124.)

"They each have different responsibilities for the Army, leading to different priorities and unique tribal languages. Deconflicting those is a major challenge," Stein said. Critical to the success of the PM is fostering good relations with all of its customers.

One way PM DCATS addressed the challenge of serving this variety of customers was to look for efficiencies in program portfolios and to seek out the best home for missions that would fit better elsewhere.

The best example of this was the 2015 realignment of Vehicular Intercom Systems from the DCATS portfolio to a more natural home at the Program Executive Office for Command, Control and Communications – Tactical (PEO C3T), which Stein said "is perfectly suited for the work of supplying intercom systems for crew-served tactical vehicles like the Humvee [High Mobility Multipurpose Wheeled Vehicle] or Bradley. We made the case to realign the program not long after I arrived at DCATS in August 2014, and C3T took the reins less than a year later. That change was readily recognizable and worked out well."

PM DCATS greatly improved communication channels with the Army's chief information officer/G-6, embedding DCATS into the Army's part of the planning, programming, budgeting and execution (PPBE) process upfront to more proactively manage priorities for site installations and modernization. "This upfront investment during the PPBE process has helped both organizations plan further in advance and minimized end-of-year scrambling to obligate money set to expire," Stein said.

DEVELOPMENT NEVER ENDS

The actor, cowboy and humorist Will Rogers used to say, "Even if you're on the right track, you'll get run over if you just sit there." In Stein's world, that is to say that development never truly stops within any portfolio—a departure from the traditional acquisition-milestone mindset that views a program as strictly linear. This is particularly true in SATCOM, where the Army is constantly chasing to keep up with commercial technology, Stein said. "With the rapid advance of computing and communications technology, every program in this sector will continually be, at least in part, in the developmental stage," he said.

"For SATCOM, we look to industry to shape the requirement based on the technology available today, which keeps us ahead of the emerging threats of tomorrow."

For example, the Combat Service Support Very Small Aperture Terminals (CSS VSAT) are in sustainment, but the program is already beginning to form

IT STARTS AND ENDS WITH PEOPLE

Stein speaks at the Armed Forces Communications & Electronics Association of Northern Virginia (AFCEA NOVA) 15th Annual Army IT Day in March 2016 in Tysons Corner, Virginia. As PM, Stein relied on SATCOM experts to guide technical decision-making and applied his own acquisition knowledge and leadership skills to build a team to execute those decisions. (Photo courtesy of AFCEA NOVA)

DEVELOPMENT NEVER ENDS

Spc. Joseph Callaway, left, and Sgt. Christopher Peterson, both with the 89th Sustainment Brigade, work on a VSAT during Combat Support Training Exercise 86-16-03 at Fort McCoy, Wisconsin, in August 2016. The VSAT illustrates an unusual feature of SATCOM acquisition: Because satellite technology is constantly evolving and industry is continuously investigating new applications, few of the products and programs under Stein's purview leave the developmental phase. While sustaining the current equipment, the VSAT team is already working on the requirements for the next tactical satellite terminal. (U.S. Army photo by Spc. John Russell, 86th Training Division)

the requirements for the next generation of tactical terminals for logistics and sustainment. The Land Mobile Radio (LMR) product office has already fielded systems to Army installations worldwide, but it just launched the Army CONUS [continental United States] Enterprise contract vehicle to improve interoperability and survivability of the LMR networks while increasing competition in a market dominated by just two vendors.

Of all the product management offices, Wideband Enterprise Satellite Systems owns more of PM DCATS' traditional research, development, test and evaluation programs, exploring future SATCOM technologies such as protected communications and digital intermediate frequency. Digitizing the SATCOM terminal architecture will improve the reliability of deployable communications and their ability to cope with extreme weather events, reducing the amount of required surge capability in each theater, among other benefits. Even these efforts are expected to rely extensively on identifying the appropriate commercial off-the-shelf technology and modifying it for a military environment.

INDUSTRY ADVANCES CHANGE REQUIREMENTS

Ultimately, it is the end user—the Soldier—whose voice matters most in the mix of perspectives on any PEO's programs. In this respect, PM DCATS faces an uncommon challenge. A typical PM shop has a TCM—a TRADOC (U.S. Army Training and Doctrine Command) capability manager—but the diversity of the DCATS portfolio makes it difficult to have that sort of dedicated representation.

"If I were PM Abrams, managing the U.S. Army's main battle tank, the requirement would be shaped to address specific threats," Stein noted. "For SATCOM, we look to industry to shape the requirement based on the technology available today, which keeps us ahead of the emerging threats of tomorrow."

This is particularly relevant to the DCATS mission, as SATCOM relies on industry advances. "Our team is constantly searching for and staying on the pulse of what new capabilities industry is developing in the area of satellite and terrestrial communications so that we can provide assured communications. This is

key to maintaining the readiness of the Army and DOD," Stein said.

INDIVIDUAL ATTENTION

While the technology DCATS fields is the same at every installation worldwide, each theater is unique—be it in facilities, geography or command policy—which translates to distinct challenges for each.

"To confront these, we engage in person with each stakeholder through technical interchange meetings and sustain that engagement through regular communication," Stein said. This degree of engagement requires extensive, often repetitive, travel, but it pays significant dividends in the mutual understanding and cooperation that those meetings foster, he added. "We also maintain labs at Aberdeen Proving Ground, Maryland, and Fort Huachuca, Arizona, and forward-assigned personnel at five sites spread across two continents to keep our experts tied at the hip to the end users," he said. "Through these efforts, we get to better know our stakeholders' priorities, risks and concerns, and they are able to better appreciate ours."

DOD SATCOM collectively—the Defense Information Systems Agency, Army, Navy, everyone—has a severe configuration management problem at the DOD SATCOM Gateway sites, Stein said. "Gateways" are ground stations where the satellite terminals and dishes that provide communications capabilities to the services are located. "Between all the agencies, a proverbial forest of SATCOM technology sits at these sites—but our lack of awareness means we don't know what kind of 'trees' are there. DCATS took the initiative to scale up the internal DCATS configuration management systems and is making significant strides toward providing that service for the Army as a whole."

While there is no official requirement for it to do so, Stein continued, "PM DCATS is taking the initiative to fill this critical gap in part because it could be considered a subtask to everything else DCATS does." That thinking illuminates Stein's forward-looking approach to managing a project and customer service.

"As we go from day to day, we strive to ensure that Soldiers, sailors, airmen and Marines stationed around the world can take for granted their assured communications for the fights of today, tomorrow and the distant future," he said shortly before relinquishing the PM DCATS charter.

CONCLUSION

The Army relies on SATCOM every day. "And when we've done our job well at DCATS, you don't give a second thought to how your IP-enabled phone connects or your internet and email traffic passes over fiber optics," Stein said. "From the end user's perspective, their computer plugs into a wire and a server rack somewhere in a closet and then to the internet."

But without the dedicated, daily efforts of the DCATS team, those connections would be incomplete. "You hear it all the time—because it's true—that people are our greatest asset. For a PM, if the people on your team are not happy, they won't be focused on the mission, and that mission will suffer as a result. Gen. Colin Powell [USA (Ret.)] said that 'Leadership is all about people. It is not about organizations. It is not about plans. It is not about strategies. It is all about people—motivating people to get the job done. You have to be people-centered.' "

For more information on leadership, Stein recommends Powell's books, specifically, "It Worked for Me: In Life and Leadership," and "Lincoln on Leadership: Executive Strategies for Tough Times" by Donald T. Phillips.

MR. JAMES CHRISTOPHERSEN is a public affairs professional with Bowhead Total Enterprise Solutions LLC providing contract support to PM DCATS. He has supported various offices of the Army acquisition enterprise since 2014, including the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology. He graduated with a B.S. in psychology from LeTourneau University in Longview, Texas, and earned his Project Management Professional certification in 2015.

> *Development never truly stops within any portfolio—a departure from the traditional acquisition-milestone mindset that views a program as strictly linear. This is particularly true in SATCOM, where the Army is constantly chasing to keep up with commercial technology.*

PM DCATS PROGRAMS AND DEPENDENCIES

The PM DCATS systems that Col. Charles M. Stein managed for three years are divided among three product offices encompassing more than 100 unique projects, valued at more than $500 million annually.

Wideband Enterprise Satellite Systems (WESS) is responsible for approximately one-third of the new Modernization of Enterprise Terminals Program's strategic satellite "dishes," replacing 78 fixed terminals across the globe and giving the U.S. military's strategic communications backbone a new, 40-year lease on life. More than 50 unique projects in the WESS portfolio modernize DOD's Enterprise Satellite Gateways and the hardware and software systems used to control bandwidth for Wideband Global SATCOM and the legacy Defense Satellite Communications System satellites.

Defense-Wide Transmission Systems provides the SATCOM link for forward-deployed logistics and sustainment personnel and has fielded more than 3,600 Combat Service Support Very Small Aperture Terminals.

The Land Mobile Radio product office provides the infrastructure and radios for first responders—police, fire and emergency medical services—on Army installations worldwide.

DEFENSE-WIDE TRANSMISSION SYSTEMS

DOLLAR VALUE:
Over $100 million annually

DEPENDENCIES (ORGANIZATIONS AND AGENCIES):

Army G-4, Army Corps of Engineers, U.S. Army Medical Command (MEDCOM), U.S. Army Communications-Electronics Command, U.S. Army Combined Arms Support Command, U.S. Army Materiel Command, Military Surface Deployment and Distribution Command, U.S. Army Training and Doctrine Command, Army G-3/5/7, Army G-8, Naval Air Systems Command, 335th Signal Command, Defense Information Systems Agency (DISA), MEDCOM Office of the Surgeon General, 7th Signal Command, International Security Assistance Force, U.S. Army Pacific, Joint Special Operations Command, 5th Signal Command, 311th Signal Command

PRODUCT DEPENDENCIES:

Combat Service Support (CSS) Automated Information Systems Interface (CAISI), CSS VSAT and the World Wide Technical Control Improvement Program.

SOLDIER CAPABILITIES DELIVERED:

- Commercialization of C4 (command, control, communications and computers).
- Network operations.
- Connect the Logistician – CAISI, VSAT.
- Technical control facilities.

KEY FACTS:

- 8 major programs and 32 projects.
- Fully redundant global satellite coverage: 15 satellites, 22 beams.
- Fielded over 32,000 CAISI Wireless 2.0 and 3,600 CSS VSAT systems.

WIDEBAND ENTERPRISE SATELLITE SYSTEMS

DOLLAR VALUE:
More than $300 million annually

DEPENDENCIES (ORGANIZATIONS AND AGENCIES):

U.S. Army Network Enterprise Technology Command, DISA, U.S. Navy, U.S. Air Force, U.S. Marine Corps, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, Space and Naval Warfare Systems Command, international allies (Australia, Great Britain, Canada, Denmark, Luxembourg, Netherlands and New Zealand), Warfighter Information Network – Tactical, DOD Gateway sites (formerly known as Teleports, STEP and Enterprise sites), White House Communications Agency, Missile Defense Agency, National Military Command Center

PRODUCT DEPENDENCIES:

WESS develops, acquires, produces, fields and sustains reliable, effective and supportable enterprise wideband satellite communications systems for DOD, the Army and the joint warfighting community. WESS provides combatant commanders, deployed military personnel, DOD and national leadership with secure, high-capacity satellite connectivity. WESS also provides satellite payload control systems to plan, monitor and manage the Wideband Global SATCOM and the Defense Satellite Communications System satellite constellations.

SOLDIER CAPABILITIES DELIVERED:

- Enterprise Earth terminals.
- Restoral terminals.
- Baseband systems.
- Wideband satellite operation centers.
- Payload planning and configuration.
- Regional satellite support centers.

KEY FACTS:

- 10 major systems and 50 projects.
- Widely fielded in 4 continents, 12 countries and 7 islands.
- Completed installation of 18 terminals, with 10 more in progress.
- $168 million in FY17 budget authority.

LAND MOBILE RADIO (LMR)

DOLLAR VALUE:
$27 million to $30 million annually.

DEPENDENCIES (ORGANIZATIONS AND AGENCIES):

HQDA CIO/G-6, U.S. Army Installation Management Command, U.S. Army Network Enterprise Technology Command, U.S. European Command, U.S. Southern Command, U.S. Northern Command, U.S. Africa Command, U.S. Pacific Command, U.S. Air Force, U.S. Navy, 335th Signal Command, 106th Signal Brigade, 93rd Signal Brigade, 7th Signal Command, 5th Signal Command, 311th Signal Command

PRODUCT DEPENDENCIES:

LMR systems are commercial solutions that provide mobile and portable communication support for garrison public safety, force protection and facilities maintenance operations. Among the primary users of LMR are installation military police, fire departments and emergency medical personnel. LMR maximizes the use of scarce radio spectrum and provides secure voice transmission and mutual aid interoperability with local, state and federal entities.

SOLDIER CAPABILITIES DELIVERED:

- System management centers.
- Repeaters.
- Dispatch consoles.
- Handheld, mobile and desktop radios and antennas.

KEY FACTS:

- Fielded at 25+ military installations in CONUS.
- Fielded at 10+ military installations outside CONUS.

DR. GEORGE V. LUDWIG

COMMAND/ORGANIZATION:
U.S. Army Medical Research and Materiel Command

TITLE:
Principal assistant for research and technology

YEARS OF SERVICE IN WORKFORCE: 23

DAWIA CERTIFICATIONS:
Level III in science and technology management and in engineering; Level I in program management

EDUCATION:
Ph.D. in veterinary science, University of Wisconsin; M.S. in wildlife biology, Colorado State University; B.S. in zoology, University of Maryland

AWARDS:
Superior Civilian Service Medal, U.S. Army Medical Research and Materiel Command; Civilian Employee of the Year, Category III, U.S. Army Medical Command; Superior Civilian Service Medal, U.S. Army Medical Research Institute of Infectious Diseases; Achievement Medal for Civilian Service; U.S. Food and Drug Administration's Commissioner's Special Citation; Certificate of Appreciation for support of the Joint Program Executive Office for Chemical and Biological Defense and the Critical Reagents Program; Order of Military Medical Merit; Fort Detrick Man of the Year

Managing the frontiers of military medical research

As you might have noticed from his professional information, Dr. George V. Ludwig has received numerous awards and commendations in his 23-year career. Which does he find the most meaningful? A letter of appreciation from the government of Zaire (now the Democratic Republic of the Congo), thanking him for his work to contain an Ebola outbreak in the early 1990s. "More than the others, that award reminds me why I went into federal service and why I stayed: to give something back. It reinforces the 'service' aspect of government service."

Federal service isn't the typical career path for those with doctoral degrees in veterinary science. "If you had told me 30 years ago that I'd be working for the Army, I would have said you were nuts," he conceded. One of his professors at the University of Wisconsin worked with researchers at the U.S. Army Research Institute for Infectious Diseases, a subordinate unit of the U.S. Army Medical Research and Materiel Command (USAMRMC), and Ludwig did a postdoctoral assignment there. "After the postdoc, I became a primary investigator, then a branch chief, and now here I am," he said.

Ludwig, who was appointed to the Senior Executive Service (SES) in February, continues a family legacy of federal service: His father, also an SES member, worked for NASA and the National Oceanic and Atmospheric Administration. His wife works for the U.S. Department of Health and Human Services, and his sister, a former Army officer, now works for the U.S. Department of Homeland Security as a Coast Guard officer.

As USAMRMC's principal assistant for research and technology, Ludwig exercises scientific oversight and management of the Army and DOD medical science and technology programs—budgeted at $1.5 billion in FY16. These programs encompass military operational medicine, combat casualty care, military infectious

diseases, clinical and rehabilitative medicine, medical simulation and health information technology, medical chemical and biological defense, and special-interest research programs directed by Congress.

He oversees research conducted within the command's worldwide laboratory system, which includes six labs in the continental United States and three outside. "These programs ensure that the Army has the capability it needs to prevent disease and injury and, in the case of illness or injury, to treat the effects of those injuries no matter where or how Soldiers are deployed," he said.

USAMRMC research focuses on enduring needs—treating combat injuries, for example—and explores ways to apply new technologies. Ludwig cited a handful of new approaches that hold promise for Army medical research and development (R&D), including synthetic biology, which offers ways to correct problems at a basic, cellular level, and biomedical modeling, which can predict system functions better than conventional laboratory experimentation. Also promising are developments in systems biology, which looks at the Soldier as a system of systems and aims to improve system interactions. "Research in all of these areas could mean solutions for problems we've long considered intractable, such as post-traumatic stress disorder," Ludwig said.

SHARING EXPERTISE

Ludwig addresses the 2017 Military Medical Partnership Conference and Expo in Ellicott City, Maryland, in March. (U.S. Army photo by Melissa Myers, USAMRMC Public Affairs)

Ludwig's involvement with acquisition started out of obligation: It became a requirement for employment during the early stages of his career. "It was only through years of personal and professional maturation that I came to understand how important a detailed understanding of the acquisition process is to ensuring that I can fully support the Army's R&D mission," he said. "The entire reason my position is needed by the Army is to ensure that the warfighter possesses the necessary medical capabilities to fight and win wars. Given the complexity of the DOD acquisition process, it would be impossible to meet that mission without being a part of the acquisition workforce."

Ludwig identified two events in particular that helped shape his understanding of Army acquisition and helped him develop the skills to lead within USAMRMC. First was his decision to seek a broadening personnel assignment out of the medical laboratories and into an R&D oversight position at USAMRMC headquarters. "My laboratory experience provided valuable basic knowledge of the Army's needs and gave me the opportunity to develop a scientific and professional reputation," he said. "But by moving to USAMRMC headquarters, I grew to understand the scope of the military medical requirement and was able to put into perspective the purpose of the Army medical laboratories."

Also important was completing the Sustaining Base Leadership and Management (SBLM) course at the Army Management College. "Attending SBLM helped provide the basis of my understanding of how the Army runs and functions within the broader DOD," he said. It is essential, he said, to accept difficult assignments and seek out others who are more knowledgeable and experienced. "That means taking broadening assignments and having the confidence to engage in conversation with other leaders."

He urged others interested in a similar career to take advantage of educational opportunities offered through the military or civilian education system and to attain acquisition certifications and membership in the acquisition workforce and Army Acquisition Corps. "Lastly, and most importantly, exude confidence in all you do without being overconfident," Ludwig said. "Such confidence sets the stage for open dialogue that serves to build highly effective teams and drive toward success."

—MS. SUSAN L. FOLLETT

FROM THE DIRECTOR,
U.S. ARMY ACQUISITION SUPPORT CENTER

HCSP: A ROAD MAP TO GET WHERE WE WANT TO GO

"If you don't know where you are going, any road will get you there."
—Lewis Carroll

Craig A. Spisak
Director, U.S. Army Acquisition Support Center

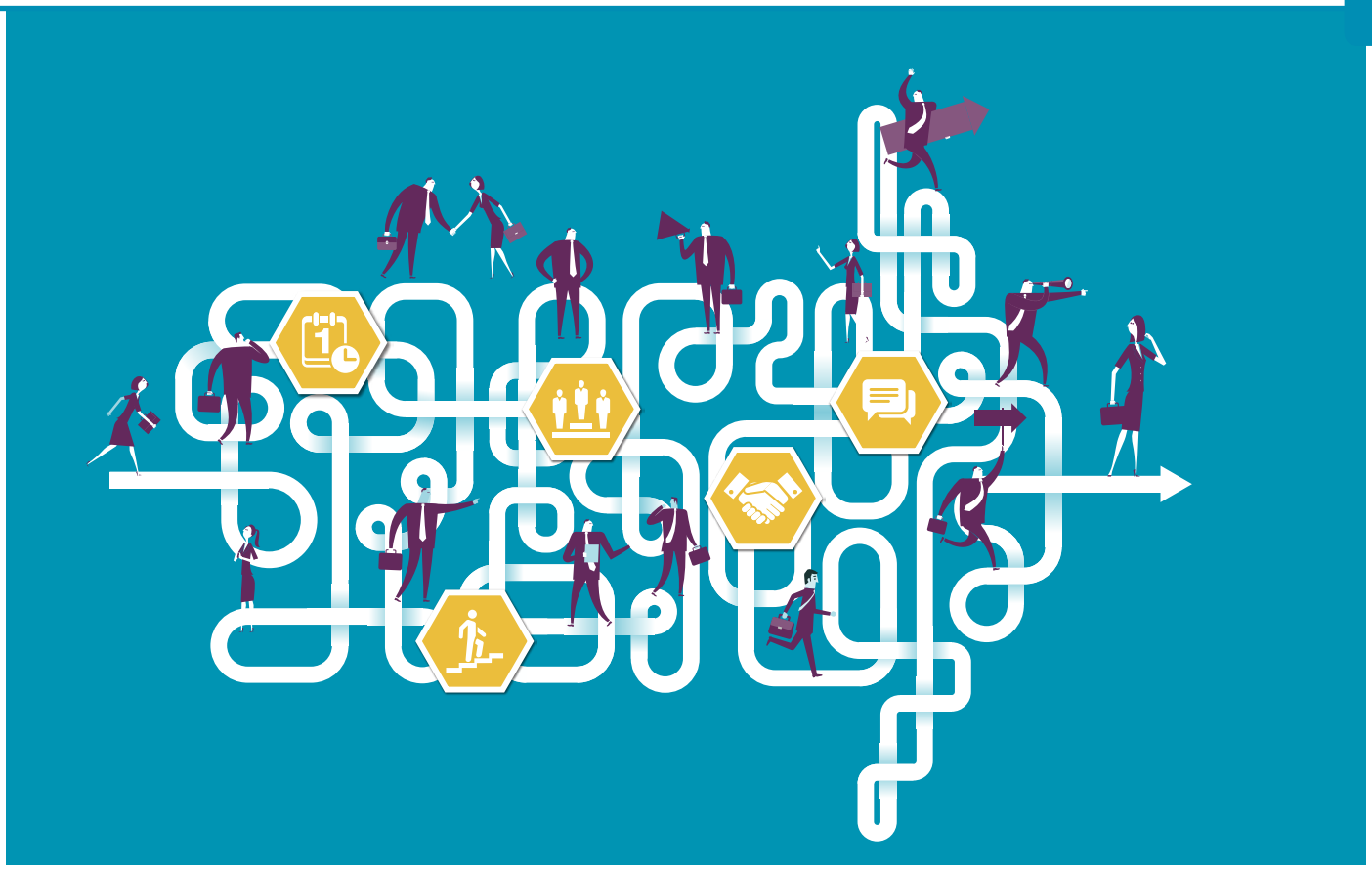
Hesitant as I am to juxtapose "Alice in Wonderland" and the Army Acquisition Workforce Human Capital Strategic Plan (HCSP), there's a lesson for us here. Determining where we want to end up is why we developed the HCSP.

Although we have an incredible amount of activity at the U.S. Army Acquisition Support Center (USAASC) focused on taking care of people—to get them scheduled for classes, assess competencies, provide targeted training, educational and experiential opportunities, ensure that we have programs that develop them as both functional experts and leaders—we've always known it's necessary to have an understanding of what we're trying to accomplish at the macro level. The HCSP in effect codifies where we're trying to go as we take care of this incredible asset, the Army Acquisition Workforce (AAW).

We didn't do that in a vacuum by having the USAASC team come up with ideas, analyze the data and decide what makes sense. The strategic planning was done with the full participation and cooperation of representatives and thought leaders from around the Army and the acquisition community. We had input from all the potential stakeholders about where they saw this community's needs both now and in the future. We looked at the gaps between those two and developed very specific and targeted goals on how to close those gaps.

That's what the HCSP does. There are five specific goals, to be pursued concurrently: workforce planning, professional development, leader development, employee engagement, and communication and collaboration.

The one that I typically emphasize first is communication and collaboration. The



A FLEXIBLE PATH

Managing a human system—especially one as large as the acquisition workforce—is challenging. That makes the HCSP's clearly defined goals, periodic reassessments and strategic nature even more essential. (Image by USAASC/akindo/iStock)

community that built the HCSP recognized that communication and collaboration was so important that it needed to be a stand-alone goal. It's important to recognize that these are foundational activities, things that we must do really well at all times. That's the only way to determine that we as a community are all on the same page and understand who's responsible for what, where to get resources in particular areas and how to attack those problems together. It synchronizes the efforts of the entire community to make sure that we succeed.

One of my pet peeves is strategic planning documents that don't have an accompanying action plan. Our HCSP contains a detailed implementation plan. It includes not only specific objectives, but also metrics to determine whether we're achieving our desired goals. It's important to recognize that the HCSP is a starting point: This is what we think we can accomplish and this is how we'll know whether we have succeeded. But it's a living document as well. We won't just wait a year, check the data and say that we've reached our goal, or that we haven't reached our goal and just keep going. We're also doing periodic assessments of whether our metrics are the right metrics. It's a constant analysis and evaluation.

We'll learn more over time. Sometimes it's difficult to come up with good metrics. I'm a true believer in having them mean something. I don't like being the guy who grades his own paper and then decides to set the bar really low so I get As all the time. You need to determine what the target should be. And sometimes it includes activities that are outside your span of control, and yet you're going to try to influence those, and you're going to try to achieve success in those areas. If you don't reach your target, all that tells you is there's more work to be done.

It's OK to be making progress toward a lofty goal and recognize that we're not there yet. What's important is that progress is being made. Are we doing better at an increasing rate? Are we getting closer to our goal even if we haven't hit that first threshold mark?

And of course when you're talking about human capital, it's a recognition that people are what our business is about. People get the work done. In the acquisition world, we're providing capabilities to Soldiers, but that is done through the expertise of the individuals who are performing the day-to-day functions to get those capabilities.

There's nothing more complex than human systems. It's complicated work. It hits on things like education and training and certification. But it goes way, way deeper than that. It's about competencies, including competencies in areas that we don't know we're going to need in the future. Those competencies evolve over time. If you were to talk to somebody 25 years ago about needing competencies in robotics, you might not have gotten a lot of traction. Who cared about robotics? But we know full well today how important a role autonomous systems or remotely controlled systems play in keeping our Soldiers out of harm's way.

Everything that we understand about the capabilities that we have to put into place evolves quickly over time. That includes things like building people's competencies in other areas: their leadership skills, their communication skills and their ability to work in teams. It's a vast array of work that we do on the human dimension. So I'm hopeful and optimistic that we can use this effort and the structure that we've put in place with the HCSP to come together and recognize where we are going. If we don't pay attention to our workforce in an integrated fashion, then we will have results that are both ineffective and inefficient.

If you're motivated to do a good job because you have a sense of purpose of what we do and why we do it, then this Human Capital Strategic Plan means a lot to you. It shows that we care as a community about what we do for the Army as a force multiplier and that we recognize that no matter how good we are at what we do, we can always do better.

CAREER NAVIGATOR

WHERE *is the* What?

In the absence of a single, unifying intranet, knowing where to find key resources is the next best thing.

by Mr. Steve Stark

When I came onboard as senior editor of Army AL&T magazine and a government employee in January 2016, I was surprised by just how different being a civil servant was from being an employee of private industry, even though I'd worked as a government contractor for almost 15 years. One of the biggest differences in the federal workplace is the lack of an employee intranet. For many companies, the employee intranet is very literally where everything is or is connected to. "There are a lot of resources," Craig Spisak, director of the Army Acquisition Support Center, told me. "You just have to find them." He could not have been more right. In fact, I wasn't aware of many of these resources until I started researching this.

Company directory? Time charging? Webmail? Job openings? Training? Retirement? Holiday calendar? Benefits? Company policies, ethics and code of conduct? Knowledge management? Capabilities, from skill sets to technology centers? Travel? Company news? In the companies I'd worked for over the last 20 years, it was all on the intranet, a website owned and operated by the company exclusively for the use of employees and of significant benefit to the company itself. A well-run and -maintained intranet is a wonderful resource.

Army Knowledge Online has certain intranet qualities, but the sheer size of the Army, with the vast diversity of employee roles, organizations and missions, makes it an unwieldy resource as an intranet replacement. In fact, to use it that way would be next to impossible.

"There are a lot of resources," Craig Spisak, director of the Army Acquisition Support Center, told me. "You just have to find them."

It's not an all-or-nothing issue, however. There are a number of well-designed, useful (and in some cases, indispensable) web resources available to the Army Acquisition Workforce to help them stay on top of their careers. So, in an effort to pull together some of the sites that civilian workforce members need to know and use, here is a short list of highly beneficial links.

At the top of the list are the milSuite Civilian HR site (**https://www.milsuite.mil/book/community/spaces/Civ-HR**) and the Army Civilian Personnel Online (CPOL) site (**https://acpol.army.mil/ako/cpolmain**). The latter is, as it promises, "a one-stop site that provides access to all the information you may need as a civilian personnel employee." It replaced **http://cpol.army.mil/index.html**, which ceased to exist as of Oct. 1. The milSuite Civilian HR site offers many of the same links as CPOL and may eventually replace it. It provides a host of resources that a private-industry employee might find on a company intranet, from time-charging on ATAAPS (DOD's Automated Time Attendance and Production System) and pay stubs (MyPay) to the Defense Travel System and retirement (the Thrift Savings Plan), plus a whole lot more. It's not perfect, but it's an excellent resource. And it's easy to make suggestions to improve it because of milSuite's interactive features.

Virtually all of the linked sites there require a Common Access Card (CAC) to log in. MilSuite requires registration, but it's open to those who have a DOD CAC through a simple process. MilSuite uses the Defense Enrollment Eligibility Reporting System (DEERS), which serves military members, retired service members and their dependent family members, among other beneficiaries, to validate users before creating an account—so, if you're in DEERS, you should have no problem. And milSuite offers a great deal of utility to users, with interactive functions far too numerous to mention here.

Army acquisition personnel should also have the website of the U.S. Army's Office of the Director for Acquisition Career Management (DACM) at the top of their bookmarks list. Go to **http://asc.army.mil/web/dacm-office/** for Army acquisition career-related information, including the DACM News and links to several career management sites, notably the Career Acquisition Management Portal (CAMP) to manage official records and apply for certification, the Army Training Requirements and Resources System (ATRRS) to register for Defense Acquisition University (DAU) training, and the DAU iCatalog to find certification and training requirements and courses.

Finally, there's webmail via Microsoft's Outlook web email app. Go to **https://web.mail.mil** to check your email. You'll need your CAC. While you're there, send us links that you find particularly useful so that we can add them to our repository on Army AL&T News online at **ArmyALT@gmail.com**.

MR. STEVE STARK is senior editor of Army AL&T magazine. He holds an M.A. in creative writing from Hollins University and a B.A. in English from George Mason University. In addition to more than two decades of editing and writing about the military, science and technology, he is, as Stephen Stark, the best-selling ghostwriter of several consumer health-oriented books and an award-winning novelist.

AAW HUMAN CAPITAL STRATEGIC PLAN: YEAR ONE

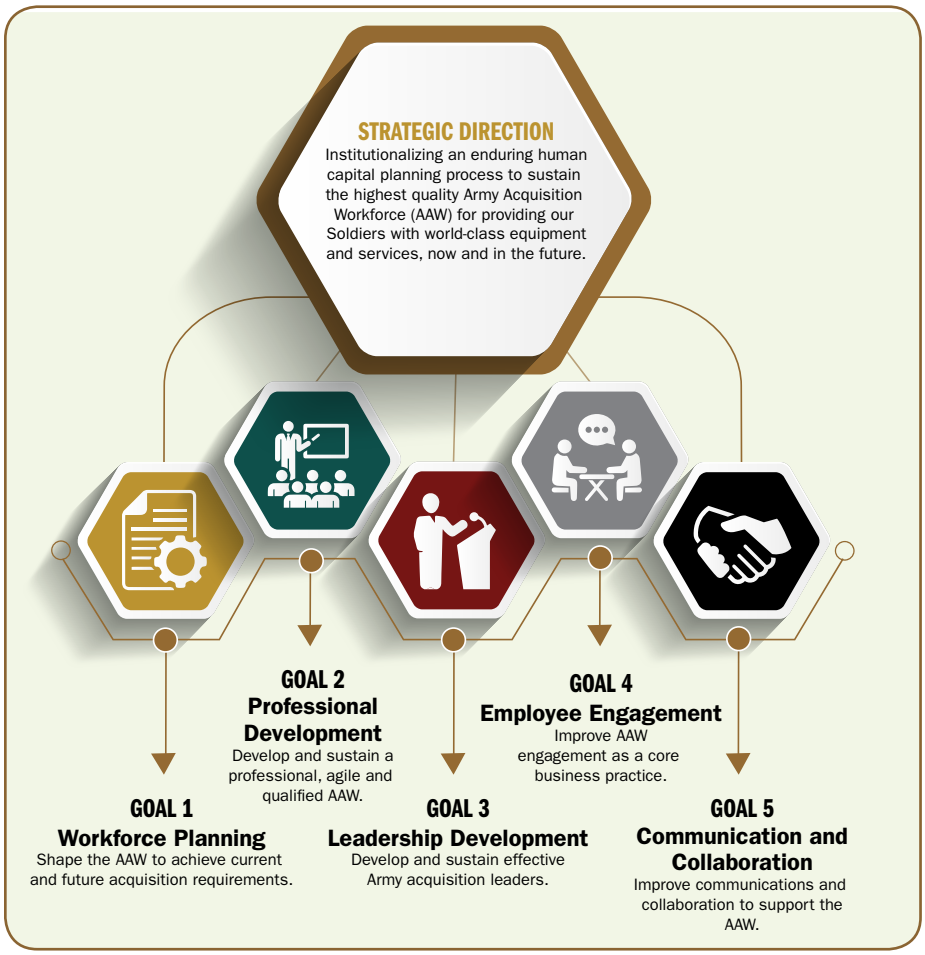
More than 30 initiatives are underway, and the Army DACM Office is just getting started on a concerted multiyear effort to further enhance acquisition professionalism.

by Ms. Joan L. Sable

October 2017 marks the completion of the first year of a five-year Army Acquisition Workforce (AAW) Human Capital Strategic Plan (HCSP), led by the U.S. Army Director for Acquisition Career Management (DACM) Office, an organization dedicated to you and your acquisition career. This plan is a key component to support human capital management efforts and the Army's No. 1 priority: readiness. Together, we have a responsibility to ensure that our AAW maintains a competitive edge and can face any challenge.

This investment in the AAW is supported by your senior acquisition leadership. Lt. Gen. Paul A. Ostrowski, the principal military deputy to the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)) and the director of the Army Acquisition Corps, said in a recent discussion: "It is clear, from industry to government, from public to private sectors, that people make the difference between organizations which succeed and those that fail. By investing in people, through education, broadening opportunities and training, true leading-edge organizations are able to gain the human capital they need to dominate—so, too, must the Army, and the Human Capital Strategic Plan is designed to do just that."

FIGURE 1



FIVE LINES OF EFFORT

The Human Capital Strategic Plan, launched in October 2016, establishes five broad goals, or lines of effort, designed to ensure that the AAW is ready—well-qualified, trained, agile and responsive—to support Soldiers with world-class equipment and services. (Graphic courtesy of the Army DACM Office)

The HCSP helps to establish goals, objectives and strategic initiatives that support the development of a professional AAW. Outlined in the HCSP are five goals, addressing workforce planning, professional development, leadership development, employee engagement, and communication and collaboration. (See Figure 1.) The goals are themes or statements of purpose to align human capital strategies to the ASA(ALT) mission. Under each of the five goals are multiple objectives identifying measurable, desired outcomes.

WHERE ARE WE NOW?

The official launch of the HCSP in October 2016 began with a virtual town hall attended by more than 1,000 members of our Army Acquisition Workforce. Thank you for attending, sharing your thoughts and asking insightful questions. Many of your questions and concerns from the town hall regarding leadership development, certifications and workforce development reinforced the strategic initiatives selected to support each of the five goals. Additionally, the forum confirmed the need to establish a governance process to guide strategic planning and address emerging challenges. This is a team effort, and your questions and concerns directly impact the successful implementation of the HCSP.

What good is a plan, however, if there is no action toward its implementation? Since October 2016, your Army DACM Office has launched a number of strategic initiatives across the five goals outlined in the plan; in all, there are over 30 initiatives. While not all of them started last October, they represent a significant scope of activity.

WHY IS THIS IMPORTANT?

The Army outlines four pillars of readiness—manning, training, equipping and leader development—to support a full range of military operations. The AAW touches all four pillars, playing a critical role in providing modernized and ready, tailored land force capabilities to meet combatant commanders' requirements. Acquisition professionals develop, procure, field and sustain the world's best equipment and services by leveraging technologies and capabilities efficiently to meet current and future Army needs.

To maintain and sustain this effort to support Army readiness, we continually improve the Army's capability in all stages of materiel development by developing a professional acquisition workforce and supporting the acquisition community at all levels. How do we make the right professional development opportunities available to the workforce? AAW feedback reported through the

Army Acquisition Career Development Assessment will help decision-makers focus human capital planning and investment.

How do we best address and prioritize planning, resources and emerging issues? An established governance structure enables ASA(ALT) to leverage enterprisewide knowledge and resources, reduce redundancies in programs and resources, and optimize human capital support critical to the Army mission. Two key initiatives arising from the HCSP meet the Army's priority of readiness:

- The HCSP governance process.
- The Acquisition Career Development Assessment.

GOVERNANCE PROCESS

Creating a process to validate, prioritize and integrate human capital programs is vital to sustaining an AAW that can provide our Soldiers with world-class equipment and services, now and in the future. An institutionalized governance process meets one of the HCSP's strategic goals: to "improve communications and collaboration." At its core, the process puts into operation how we manage the HCSP and implement the initiatives.

Over the past year, your Army DACM Office has led efforts to create a structure, identify membership and establish a cycle of activities. The governance structure includes a mix of formal governance bodies and temporary integrated project teams. (See Figure 2, Page 136.) The Army acquisition executive has overall oversight for the governance structure, which includes four governing bodies:

- Executive Steering Committee (ESC), comprising senior Army leaders. The ESC approves the strategic direction, goals and objectives for the HCSP. It ensures accountability and senior leader focus. The first ESC meeting was in early August.
- HCSP Council: Monitors the goals and objectives and tracks progress and achievement of initiatives.
- AAW Advisory Board: Provides input from the AAW on the goals, objectives and initiatives.
- Integration team: Coordinates efforts across the Army and the Office of the Secretary of Defense, implements initiatives and develops action plans. The team consists of key stakeholders such as ASA(ALT) leadership and staff, Army DACM Office staff, Army acquisition functional leaders and advisers, organizational acquisition career management advocates, command and program executive office representatives, and human capital and Army/command G-1 experts.

These governing bodies operate both from the top down and the bottom up. At the strategic level, senior leaders provide guidance as well as review. At the operational level, the HCSP Council, in conjunction with the AAW Advisory Board and goal champions (who advocate for a goal, or for objectives or initiatives within a goal), plan and manage the execution of the human capital strategy.

Last but not least, the integration team focuses on tactical execution to achieve objectives. The team's principal function is to manage the change process and identify, integrate, leverage and catalog human capital information. The collected information is used to improve AAW human capital programs and initiatives, to ensure that strategic planning and decision-making are supported by key information, and to identify the resources needed to accomplish human capital priorities. As the Army's priorities evolve, this governance structure supports development, coordination, alignment and integration of new initiatives.

CAREER DEVELOPMENT ASSESSMENT

For the first time, the AAW received an assessment of competency importance and skill levels specific to acquisition career fields (ACFs). The Acquisition Career Development Assessment supports the HCSP, specifically responding to the goal to develop and sustain a professional, agile and qualified acquisition workforce. The assessment was delivered via a web-enabled tool from TrueChoice Solutions Inc., uniquely modeled to capture responses from our AAW regarding:

- Proficiency in and importance of leadership competencies.
- Proficiency in and importance of ACF-specific functional and technical competencies.
- Allocation of time spent on work-related tasks (e.g., activities related to leadership, functional and technical competencies, training and administration).
- AAW career preferences.

Thank you to the more than 6,000 members of the AAW who took the time to participate in the inaugural assessment. Workforce members in each of the ACFs received a customized assessment, starting with the contracting ACF in March and continuing through the summer with releases for 12 additional ACFs.

The data collected from the assessment will guide decision-making in the planning and execution of initiatives through the human capital life cycle. Targeting investments in your professional development ensures that our acquisition workforce remains relevant and proficient, with the right skills and

FIGURE 2

COMMUNICATION GOES BOTH WAYS

Feedback from members of the AAW confirmed the need to establish a governance structure to guide the evolving process of human capital strategic planning. The HCSP calls for ongoing, two-way communication as a foundation for all efforts to strengthen the acquisition workforce. (Graphic courtesy of the Army DACM Office)

capabilities in their areas of expertise. We have programs, tools and stringent education requirements in place to ensure that our civilian and military professionals maintain a competitive edge in the acquisition community and can meet combatant commanders' requirements across the range of military operations. We will continue to meet the needs of the nation and remain vigilant with the resources provided to us.

STAY INFORMED AND ENGAGED

If you missed the opportunity to provide feedback during the inaugural competency assessment in 2017, your Army DACM Office is working toward establishing a repeatable process for competency management to inform future professional development investments. Targeting our human capital investments based on assessed needs will ensure a ready and able AAW.

The HCSP is a commitment to you, our Army Acquisition Workforce. As part of our ongoing efforts to keep the AAW informed and engaged, we will be out in the field conducting workshops at key commands and locations. This is an opportunity for two-way communication; we want to receive feedback from you about the plan's implementation or any emerging AAW challenges.

For more information and a copy of the plan, go to ***http://asc.army.mil/web/hcsp****. We welcome your feedback, thoughts and comments at* ***usarmy.belvoir.usaac.mbx.usaac-aaw-hcsp@mail.mil****.*

MS. JOAN L. SABLE is chief of the Human Capital Initiatives Division in the Army DACM Office. She holds an MBA from Strayer University and a B.S. in education from Longwood University, and has worked in the Army acquisition community for more than 17 years. She is Level III certified in program management and a member of the Army Acquisition Corps.

ON THE MOVE


1


2

HEADQUARTERS, DEPARTMENT OF THE ARMY

1: NEW ARMY CIO/G-6 PROMOTED, SWORN IN

Lt. Gen. Bruce T. Crawford, the Army's newest chief information officer (CIO) and G-6, was promoted from major general Aug.17 during a ceremony at Fort McNair, Washington, led by **Gen. James C. McConville**, vice chief of staff of the Army. Crawford's wife, **Dianne**, and son **Corey** added the new rank to his epaulets.

Crawford assumed the role of CIO/G-6 on Aug. 1, sworn in via video teleconference by his older son, **Capt. Bruce Crawford Jr.**, who is assigned to the 3rd Infantry Division at Fort Stewart, Georgia. He takes over from **Gary C. Wang**, who served as acting CIO after the April retirement of **Lt. Gen. Robert S. Ferrell** and now returns to the job of deputy CIO, to which he was appointed in April 2014.

As CIO, Crawford manages the Army's $10 billion information technology budget to support warfighting capabilities, information security, force structure and communications equipment. He most recently served as commanding general of the U.S. Army Communications-Electronics Command (CECOM) at Aberdeen Proving Ground, Maryland. Before joining CECOM in 2014, he had served as the J-6 director of command, control, communications and computers/cyber and CIO for U.S. European Command; commanding general of the 5th Theater Signal Command; and G-6 for U.S. Army Europe.

He has also served in numerous command and staff positions in Washington, D.C., Hawaii and North Carolina, including multiple combat deployments to Iraq with the 82nd Airborne Division at Fort Bragg, North Carolina.

Crawford received his commission in 1986 after graduating with a B.S. in electrical engineering from South Carolina State University. He also holds an M.S. in administration from Central Michigan University and an M.S. in national resource strategy from the Industrial College of the Armed Forces, now the Dwight D. Eisenhower School for National Security and Resource Strategy. Crawford is also a graduate of the U.S. Army Signal Corps basic and advanced courses, Airborne School, Advanced Airborne School, Ranger School and the U.S. Army Command and General Staff College. (U.S. Army photo)

U.S. ARMY MATERIEL COMMAND

2: DALY NAMED DEPUTY CG AT AMC

Gen. Gus Perna, left, U.S. Army Materiel Command (AMC) commanding general (CG), presented the certificate of promotion to **Lt. Gen. Edward M. Daly** during a ceremony Aug. 7 at AMC headquarters, Redstone Arsenal, Alabama. Daly assumed duties as AMC's deputy CG and chief of staff, succeeding **Lt. Gen. Larry D. Wyche**, who retired from the Army after serving 42 years.

Daly most recently served as CG of the U.S. Army Sustainment Command at Rock Island Arsenal, Illinois, and as chief of ordnance and commandant of the U.S. Army Ordnance School. He also served as executive officer to the deputy chief of staff, Army G-4; commander of the 43rd Sustainment Brigade, 4th Infantry Division (Mechanized) at Fort Carson, Colorado, and deployed in support of Operation Enduring Freedom, Afghanistan; deputy assistant chief of staff and chief plans officer, G-4, NATO Rapid Deployable Corps, based in Italy and deployed in support of Operation Enduring Freedom and Operation Iraqi Freedom;

and commander of the 702nd Main Support Battalion, Division Support Command, 2nd Infantry Division, Eighth Army, Republic of Korea. He also deployed in support of operations Desert Shield and Desert Storm.

Daly is a graduate of the United States Military Academy at West Point, where he earned a B.S. in engineering management. He also holds an MBA from Gonzaga University and a Master of Strategic Studies from the U.S. Army War College. His awards and decorations include the Distinguished Service Medal, Legion of Merit, Bronze Star Medal, Defense Meritorious Service Medal, Meritorious Service Medal, Joint Service Commendation Medal, Army Commendation Medal, Army Achievement Medal, Combat Action Badge and Parachutist Badge. (U.S. Army photos by Sgt. 1st Class Teddy Wade)

1: WYCHE ENDS 42-YEAR CAREER

Gen. Gus Perna, left, AMC commander, presented **Lt. Gen. Larry Wyche**, AMC deputy commanding general since April 2015, with his retirement certificate July 21, bidding an official farewell to Wyche and honoring his 42 years of service to the U.S. Army.

Wyche, who began his Army career in 1975 as a private cavalry scout, was praised as a master logistician and exemplary leader. During the ceremony at AMC headquarters, he received a surprise induction into the Quartermaster Hall of Fame. He also received the Distinguished Service Medal and the General Brehon B. Somervell Medal of Excellence, which recognizes those who excel in multifunctional logistical support and demonstrate a commitment to duty.

Perna called Wyche "an inspiring leader, wise mentor and true friend. … He has committed 42 years of his life to the profession of arms and has put the needs of the Army and the warfighter ahead of himself."

Deputy CG was not Wyche's first leadership position at AMC. Nearly five years earlier, he was assigned as deputy chief of staff for logistics and operations at Fort Belvoir, Virginia, and then Redstone Arsenal. His other leadership posts include CG of the U.S. Army Combined Arms Support Command and Sustainment Center of Excellence; CG of the Joint Munitions and Lethality Life Cycle Management Command; and director for strategy and integration in the Office of the Deputy Chief of Staff, G-4. Wyche also commanded the 10th Sustainment Brigade with duty as commander, Joint Logistics Command, Combined Joint Task Force – 7, based at Bagram Airfield, Afghanistan, during Operation Enduring Freedom. In addition, he deployed to Operation Uphold Democracy in Haiti in 1994-95.

Wyche was joined at the ceremony by several family members, including his son, Army **Maj. David Wyche**, and his wife of 37 years, **Denise**. "I've worked for so many remarkable organizations," said Wyche. "Those organizations and people will be part of Denise and me for the rest of our lives. I owe so very much to those who saw potential in me, taught me and encouraged me to go the distance. All of you are responsible for the many successes I've enjoyed."

He added, "We are warfighter logisticians, prepared to give the shirts off our backs, the boots off our feet, to support the fight. We will never say no, as long as we have one bullet to give or one gallon of gas to give."

U.S. ARMY RESEARCH LABORATORY

2: ACTING DIRECTOR OFFICIALLY TAKES CHARGE

Dr. Philip Perconti, right, became the fifth director of the U.S. Army Research Laboratory (ARL) at an Aug. 10 ceremony at the Adelphi Laboratory Center in Maryland. **Maj. Gen. Cedric T. Wins**, commanding general of the U.S. Army Research, Development and Engineering Command, officiated the ceremony, with **Sgt. Maj. Keith Taylor**, ARL's senior enlisted adviser, facilitating.

Perconti had served as ARL's acting director since April 2016, when **Dr. Thomas Russell** was reassigned as acting deputy assistant secretary of the Army for research and technology, a position to which Russell was permanently appointed in December 2016. Before that, Perconti was director of ARL's Sensors and Electron Devices Directorate. Before joining

ARL in January 2013, Perconti served for 12 years as director of the Science and Technology Division of the U.S. Army Communications-Electronics Research, Development and Engineering Center's Night Vision and Electronic Sensors Directorate.

He holds a doctorate in electrical and computer engineering from George Washington University, an M.S. in electrical and computer engineering from Johns Hopkins University and a B.S. in electrical and computer engineering from George Mason University. Perconti is a fellow of the Military Sensing Symposium and a member of the Army Acquisition Corps. He has published extensively on many aspects of military sensing as well as countermine and counter-improvised explosive device technology, has authored and co-authored more than 50 publications including three book chapters, and holds two patents. Perconti was selected for the Senior Executive Service in January 2013. (U.S. Army photo by Jhi Scott, ARL Public Affairs)

OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY FOR ACQUISITION, LOGISTICS AND TECHNOLOGY

3: ASA(ALT) WELCOMES NEW SERGEANT MAJOR

Sgt. Maj. Michael S. Clemens has been named the chief enlisted adviser to the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)), replacing **Sgt. Maj. Rory L. Malloy**, who retired in May.

Clemens most recently served as senior enlisted leader for the Combined Security Transition Command – Afghanistan, supporting Operation Freedom's Sentinel. Before that assignment, he served as command sergeant major (CSM) of the U.S. Army Armor School and the 316th Cavalry Brigade, both at Fort Benning, Georgia.

Clemens entered the Army in September 1989 and has participated in operations Desert Shield, Desert Storm, Iraqi Freedom and Enduring Freedom. He is a graduate of every level of training within the Noncommissioned Officer Education System, culminating in his graduation from the U.S. Sergeants Major Academy, the CSM Course at Fort Leavenworth, Kansas, and the CSM Executive Education Course. Clemens' military education includes the Airborne, Air Assault, Jumpmaster and Pathfinder schools. He is a graduate of the Scout and Cavalry Leaders courses, the Joint Firepower Course, the Expeditionary Warfare School Distance Education Program and the CSM/SGM Force Management Course.

Clemens is a recipient of the Draper Armor Leadership award, a member of the Sergeant Audie Murphy Club, and a distinguished member of the 15th Cavalry Regiment and the 505th and 508th Parachute Infantry Regiments. He has been inducted into the Order of Saint George and the Order of Saint Maurice.

4: NEW S&T DIRECTOR FOR DASA(R&T)

The deputy assistant secretary of the Army for research and technology welcomed **Dr. Arthur J. Goff III** as the new director of international science and technology programs. Goff arrives from the U.S. Army Medical Research Institute for Infectious Diseases, where he was a principal investigator in the Virology Division, served on the Institutional Animal Care and Use Committee and was an adviser to the World Health Organization Advisory Committee on Variola Virus Research.

PEO FOR AMMUNITION

5: CHANGE OF LEADERSHIP AT PM CAS

Col. Willie Coleman, left, relinquished the responsibility of the Project Manager for Combat Ammunition Systems (PM CAS) within the Program Executive Office (PEO) for Ammunition to **Col. Will McDonough** during a change of management ceremony July 20 at Picatinny Arsenal, New Jersey. PEO **James Shields**, center, officiated the ceremony.

"Willie has been overseeing the Army's artillery munitions and mortar systems since joining the PEO Ammo family in 2015," Shields said. "During his tenure at PM CAS, he has been instrumental in developing strategies and executing programs to counter, and stay ahead of,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a constantly evolving threat that has become more and more technologically advanced." Coleman now serves as the deputy to the deputy for acquisition and systems management for the assistant secretary of the Army for acquisition, logistics and technology. (U.S. Army photo by Todd Mozes, PEO Ammunition)

1: CHANGE OF CHARTER AT PFM

Lt. Col. Anthony Gibbs, right, outgoing product manager for precision fires and mortars (PFM), passes the flag of the Project Manager for Combat Ammunition Systems to outgoing Project Manager **Col. Willie Coleman**, marking the passing of the PFM charter in a ceremony July 7 at Picatinny Arsenal. Gibbs relinquished management to **Lt. Col. Patrick Farrell** and will attend the Dwight D. Eisenhower School for National Security and Resource Strategy. (U.S. Army photo by Todd Mozes, PEO Ammunition)

2: NEW PM FOR MANEUVER AMMUNITION SYSTEMS

Col. Hector Gonzalez, left, incoming project manager for maneuver ammunition systems, assumed responsibility from **Col. Moises Gutierrez** during a ceremony at Picatinny Arsenal on July 26. PEO **James Shields** officiated. During his three-year tenure, Gutierrez oversaw management of direct-fire munitions, delivery of standard munitions to U.S. and coalition partners, and production and delivery of roughly 400 non-standard munitions and weapon systems. He is now chief of the Capabilities and Acquisition Division for the Joint Staff in Washington. (U.S. Army photo by Todd Mozes, PEO Ammunition)

3: NEW PRODUCT MANAGER FOR SMALL CALIBER

Lt. Col. John Masternak, right, relinquished the leadership of the Product Manager for Small Caliber to **Lt. Col. Andrew S. Lunoff**, left, during a change of management ceremony conducted by **Col. Moises Gutierrez**, outgoing project manager for maneuver ammunition systems, on June 29 at Picatinny Arsenal. Masternak, who served as product manager for three years, moves to the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology. (U.S. Army photo by Todd Mozes, PEO Ammunition)

4: LEADERSHIP CHANGE AT PD CAPS

Incoming Product Director for Combat Armaments and Protection Systems (PD CAPS) **Benjamin Corrigan** addressed the audience during a July 21 change of charter ceremony at Picatinny Arsenal. Corrigan assumed leadership of PD CAPS, assigned to the Project Manager for Close Combat Systems (PM CCS), from **Gary Barber**, who will assume duties as part of the PM CCS staff. (U.S. Army photo by Erin Usawicz, PEO Ammunition)

PEO FOR ASSEMBLED CHEMICAL WEAPONS ALTERNATIVES

5: ACWA WELCOMES NEW PEO

Suzanne S. Milchling assumed duties as the program executive officer for Assembled Chemical Weapons Alternatives (PEO ACWA) June 25. Milchling, a member of the Senior Executive Service since 2011, previously served as the technical director of the U.S. Army Materiel Systems Analysis Activity. She succeeds **Conrad F. Whyne**, PEO ACWA from March 2012 until he retired in the spring.

PEO ACWA's mission is the safe and environmentally sound destruction of the chemical weapons stockpiles stored at the Blue Grass Army Depot, Kentucky, and the U.S. Army Pueblo Chemical Depot, Colorado. The PEO is aligned under the Office of the Assistant Secretary of Defense for Nuclear, Chemical and Biological Defense Programs, part of the

Office of the Undersecretary of Defense for Acquisition, Technology and Logistics.

PEO FOR AVIATION

6: NEW DEPUTY PEO FOR AVIATION JOINS SES

James B. Johnson, left, deputy to the commanding general of the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, presented **Patrick H. Mason**, deputy program executive officer (DPEO) for Aviation, with a plaque after Mason was sworn in to the Senior Executive Service. Mason's wife, **Linda**, joined him for the ceremony June 30 at Redstone Arsenal, Alabama.

Mason, who became the DPEO in May, helps lead the design, development and delivery of Army aviation systems and supports the oversight of an annual appropriation of more than $7 billion and a workforce of approximately 2,500 military, civilian and contract personnel. (U.S. Army photo courtesy of PEO Aviation)

7: NEW PRODUCT MANAGER FOR FIXED WING

Lt. Col. Jeffrey J. Jablonski, right, received the charter of the Product Manager for Transport Aircraft from **Col. Tal Sheppard**, project manager for fixed wing aircraft, during a ceremony at Redstone Arsenal July 26. Jablonski will be part of the new Fixed Wing Utility Aircraft Program, which will replace the aging fleet of C-12 and C-26 aircraft. The new platform will provide improved passenger and payload capability as well as greater range. A milestone C decision is expected in FY18. Jablonski will manage approximately 200 aircraft in 85 locations worldwide and oversee the transition and management of the recently awarded contract for logistics support. (U.S. Army photo by Tracey Ayres, PEO Aviation)

8: RETIREMENT CAPS 21-YEAR CAREER

Lt. Col. Kirk Ringbloom, left, received the Legion of Merit from **Col. Matt Hannah**, project manager for aviation systems, during Ringbloom's retirement ceremony May 15 at Redstone Arsenal. Ringbloom, who completed more than 21 years of military service, last served as the product manager for aviation ground support equipment. (U.S. Army photo by Tom Voight, PEO Aviation)

PEO FOR COMBAT SUPPORT AND COMBAT SERVICE SUPPORT

9: PEO CS&CSS MARKS PROMOTION

Col. Christopher Ford, formerly special projects officer for the Program Executive Office for Combat Support and Combat Service Support (PEO CS&CSS), was promoted to O-6 in a May 8 ceremony hosted by PEO **Scott J. Davis** in Warren, Michigan. Ford's children helped him affix his colonel's eagles to his uniform while Ford's wife, **Jennifer**, and Davis looked on. Since his promotion, Ford has been named director of the Central Technical Support Facility (CTSF) at Fort Hood, Texas. Part

of the U.S. Army Communications-Electronics Command, CTSF is charged with conducting Army interoperability certification testing for all Army tactical information systems. (U.S. Army photo courtesy of Multimedia Visual Information Center – Detroit Arsenal)

1: MRAP PROGRAM OFFICE STANDS DOWN

Col. Jason T. Craft cased the colors of the U.S. Army Program Office for Mine Resistant Ambush Protected (MRAP) Vehicles during an inactivation ceremony June 9 in Warren, Michigan, that marked the program office's stand-down. Assisting Craft were **Mike Loos**, left, deputy project manager, and **Rich McKenzie**, MRAP chief engineer and the longest-tenured Army Program Office MRAP employee.

Craft, who led the program office for the past three years, received the Legion of Merit and the Order of St. Maurice at the event. He is now assigned to the Office of the Deputy for Acquisition and Systems Management within the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (OASA(ALT)), where he is director of aviation programs. The Product Manager for MRAP Vehicle Systems is responsible for life cycle management of the MRAP fleet and is under the purview of the Project Manager for Transportation Systems within PEO CS&CSS. (U.S. Army photo by Greg Pici, Multimedia Visual Information Center – Detroit Arsenal)

2: NEW LEADERSHIP AT MRAP VEHICLE SYSTEMS

Lt. Col. Joel Franklin, right, relinquished leadership of the Product Manager for MRAP Vehicle Systems to **Lt. Col. Michael Riley**, left, at a July 10 ceremony in Warren, Michigan. The office is now part of PEO CS&CSS' Project Manager for Transportation Systems, which is led by **Col. Daniel L. Furber**, center. Franklin was presented the Order of St. Maurice and the Meritorious Service Medal. He is now with the Army element of the Joint Staff. Riley comes to the product management office from ASA(ALT), where his most recent position was as executive officer for the ASA(ALT) Strategic Initiatives Group. (U.S. Army photo by Ted Beaupre, Multimedia Visual Information Center – Detroit Arsenal)

3: PM E2S2 CHANGE OF LEADERSHIP

Scott J. Davis, PEO CS&CSS, presented **Col. Maurice Stewart** with the Legion of Merit to honor his tour as the project manager for expeditionary energy and sustainment systems (PM E2S2) during a ceremony June 14 at Fort Belvoir, Virginia. Replacing Stewart is **Col. Adrian A. Marsh**, center, who comes to E2S2 from the U.S. Army War College. Stewart has been assigned to the Office of the Undersecretary of Defense for Acquisition, Technology and Logistics. (U.S. Army photo by Tomas Ortiz, PM E2S2)

4: ARMY WATERCRAFT SYSTEMS GETS NEW LEADER

Col. Daniel L. Furber, project manager for transportation systems, officiated a June 22 ceremony in Warren, Michigan, where **Zina Kozak-Zachary** relinquished leadership of the Product Director for Army Watercraft Systems to **Chad Stocker**. Kozak-Zachary

moved to the PEO for Ground Combat Systems, where she is the product director for combat recovery systems. Stocker comes to PEO CS&CSS after completing the Senior Service College Fellowship at Defense Acquisition University Midwest Region in Kettering, Ohio. (U.S. Army photo courtesy of Multimedia Visual Information Center – Detroit Arsenal)

5: PRODUCT MANAGER FOR BRIDGING RETIRES

Bryan McVeigh, project manager for force projection, presented **Lt. Col. Jeffrey Biggans**, former product manager for bridging, with the Legion of Merit during a change of leadership and retirement ceremony April 20 in Warren, Michigan. Succeeding Biggans is **Steven Rienstra**. (Photo courtesy of Product Manager for Bridging, PEO CS&CSS)

PEO FOR ENTERPRISE INFORMATION SYSTEMS

6: AESIP CHARTER CHANGES HANDS

Brig. Gen.(P) Patrick W. Burden, left, program executive officer for Enterprise Information Systems (PEO EIS), transferred the charter of the Project Manager for the Army Enterprise Systems Integration Program (PM AESIP) in a ceremony Aug. 4 at Fort Belvoir, Virginia. **Col. Harry Culclasure**, who led the program for the past four years, relinquished the charter to **Col. Robert "RJ" Mikesh**, right, who previously served at PEO EIS as product manager for the Installation Information Infrastructure Modernization Program. (U.S. Army photo by Racquel Lockett-Finch, PEO EIS)

7: CHANGE OF CHARTER AT LMP

On June 28, **Col. Harry Culclasure**, center, outgoing project manager for AESIP, hosted a change of charter for the Logistics Modernization Program (LMP) in a ceremony at Picatinny Arsenal, New Jersey. The ceremony shifted management of the LMP from outgoing product manager **Lt. Col. Robert Williams**, left, to **Lt. Col. Michael Parent**. Parent will lead LMP as it enters its next chapter in Defense Information Systems Agency migration, fulfilling financial auditability requirements, modernizing sustainment and planning in collaboration with the U.S. Army Materiel Command. (U.S. Army photo by Erin Usawicz, Picatinny Arsenal)

8: DCATS WELCOMES NEW PM

PEO EIS **Brig. Gen.(P) Patrick W. Burden** transferred the charter for the Project Manager for Defense Communications and Army Transmission Systems (PM DCATS) from **Col. Charles M. Stein**, left, to incoming project manager **Col. Enrique Costas** at an Aug. 3 ceremony at Fort Belvoir. Costas will manage DCATS' annual budget of more than $875 million, which funds some 30 strategic satellite and terrestrial communication systems. Stein now serves as director of fires for the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)). (U.S. Army photo by Racquel Lockett-Finch, PEO EIS)

9: CHANGE OF CHARTER FOR WESS

Brig. Gen.(P) Patrick W. Burden, PEO EIS, transferred the charter of the Product Manager for Wideband Enterprise Satellite Systems (PL WESS) from **Col. Joel D. Babbitt**, left, to **Lt. Col. Anthony K. Whitfield** at a ceremony June 29 at Fort Belvoir. As the product manager for WESS, assigned to PM DCATS, Whitfield will manage the program's approximately $170 million annual budget and 50 projects around the world. Babbitt reports for Senior Service College before assuming


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his next post as the PEO for Special Operations Forces Warrior in late 2018. (U.S. Army photo by Racquel Lockett-Finch, PEO EIS)

1: GFEBS WELCOMES NEW PRODUCT DIRECTOR

Col. Matt Russell, project manager for General Fund Enterprise Business Systems (GFEBS), hosted an assumption of charter ceremony June 15 in Arlington, Virginia, for **Daniel Kitts**, the new product director for GFEBS Development and Modernization. Kitts' product office will consolidate sustainment, modernization and new development in one team, reducing redundancy while increasing the pace of product improvements. (U.S. Army photo by Indu Chauhan, PEO EIS)

2: NEW NAME, LEADERSHIP FOR ACQBUSINESS

In a change of charter ceremony for Acquisition Management Support Solutions (AMS2), formerly AcqBusiness, the charter of the Product Manager for AMS2 changed hands from **Lt. Col. Keith Harley** to **Lareina Adams**. Hosting the June 26 ceremony at Fort Belvoir was **Col. Matt Russell**, center, project manager for GFEBS, who presented Harley with the Meritorious Service Medal. The name change is part of an effort to align the program better with the Office of the ASA(ALT) and PEO EIS strategic priorities. (U.S. Army photo by Racquel Lockett-Finch, PEO EIS)

PEO FOR INTELLIGENCE, ELECTRONIC WARFARE AND SENSORS

3: NEW PM FOR SENSORS – AERIAL INTELLIGENCE

Christian Keller accepted the charter of the Project Manager for Sensors – Aerial Intelligence at an Aug. 1 change of charter ceremony at Aberdeen Proving Ground, Maryland, officiated by **Maj. Gen. Kirk F. Vollmecke**, program executive officer for Intelligence, Electronic Warfare and Sensors (PEO IEW&S). Keller replaces **Col. Thomas B. Gloor**, left, who retired from the Army.

Keller has worked for DOD as a civilian since 1984 and has held several positions at PEO IEW&S, including product and project manager and acting deputy PEO. (U.S. Army photos by Bill Schofield, PEO IEW&S)

4: LEADERSHIP CHANGE IN SENSOR PRODUCT OFFICE

Lt. Col. Andrew Koschnik, right, accepted the charter of PEO IEW&S' Product Manager for Sensors – Unmanned and Rotary Wing from **Col. Thomas B. Gloor**, outgoing project manager for Sensors – Aerial Intelligence, at a ceremony Aug. 1 at APG. Koschnik recently served as assistant professor of military science at the University of Wisconsin and as instrumentation officer for the Joint Multinational Readiness Center in Hohenfels, Germany.

PEO FOR SIMULATION, TRAINING AND INSTRUMENTATION

5: NEW PM FOR INTEGRATED TRAINING

Col. Marcus Varnadore assumed the charter of the Project Manager for Integrated Training Environment (PM ITE) at the Program Executive Office for Simulation, Training and Instrumentation (PEO STRI) on July 17 in Orlando, Florida. Varnadore recently served as the product manager for airborne, maritime and fixed station, assigned to the Project Manager for Tactical Radios within the PEO for Command, Control and Communications – Tactical, and attended Senior Service College at the Dwight D. Eisenhower School for National Security and Resource Strategy. (U.S. Army photo)

6: CHANGE OF CHARTER AT SIMULATION SUPPORT

John Womack, right, assumed the charter of the Product Manager for Constructive Simulation Support within PM ITE during an activation of charter ceremony July 27 in Orlando. At left is **Rick Copeland**, deputy PM ITE. (U.S. Army photo)

7: NEW PRODUCT MANAGER FOR MCTS

Lt. Col. Freeman Bonnette accepted the charter of the Product Manager for Maneuver Collective Training Systems, assigned to PM ITE, at a ceremony July 28 in Orlando. In his new role, he leads a team that develops and acquires a wide variety of individual and collective training simulator products that serve Army ground and air maneuver forces. (U.S. Army photo)

8: WTI GETS NEW LEADERSHIP

Lt. Col. Mario Zaltzman addressed the audience during a July 7 ceremony in which he accepted the charter of the Product Manager for Warrior Training Integration, assigned to PM ITE. Zaltzman previously served as assistant product manager supporting the product director for Medical Communications for Combat Casualty Care within the PEO for Enterprise Information Systems. (U.S. Army photo)

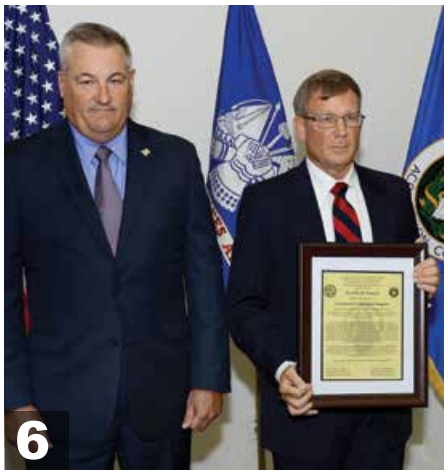
9: GCTT GETS NEW LEADERSHIP

Scott A. Pulford, deputy project manager for training devices, presented **Lt. Col. Steven D. Gutierrez** the charter of Product Manager for Ground Combat Tactical Trainers (GCTT) at a change of charter ceremony July 6 at PEO STRI in Orlando. The GCTT product manager's mission is to develop, field and sustain virtual combat systems for ground combat and aviation. (U.S. Army photo by Doug Schaub, PEO STRI)

10: RETIREMENTS AT PEO STRI

Lt. Col. Vince Grizio (top photo) addressed attendees at a July 7 ceremony at PEO STRI to honor his 23 years of service. Before his retirement, Grizio served as the product manager for warrior training integration, directly responsible for the acquisition life cycle management of a $410 million portfolio that consisted of three critical programs that support warfighters. (U.S. Army photo)

Col. Vernon Myers (bottom photo) was recognized at a July 28 retirement ceremony at PEO STRI honoring his 25 years of service, culminating in his assignment as military deputy to the executive director of Army Contracting Command – Orlando. Myers was awarded the Legion of Merit during the ceremony. (U.S. Army photo)



1: NEW TRAINING DEVICES PRODUCT MANAGER

Lt. Col. Rhea Pritchett received the charter of the Product Manager for Live Training Systems from **Scott A. Pulford**, deputy project manager for training devices, on July 21 in Orlando. Pritchett joined PEO STRI from a Training with Industry assignment with Lockheed Martin Rotary and Mission Systems in Orlando. (U.S. Army photo)

U.S. ARMY MEDICAL RESEARCH AND MATERIEL COMMAND

2: CHANGE OF COMMAND AT USAMMDA

Col. John "Ryan" Bailey, left, assumed command of the U.S. Army Medical Materiel Development Activity (USAMMDA) from **Col. William E. Geesey**, right, during a ceremony June 23 at Fort Detrick, Maryland, hosted by **Maj. Gen. Barbara R. Holcomb**, center, commanding general of the U.S. Army Medical Research and Materiel Command (USAMRMC), USAMMDA's parent command, and Fort Detrick. **Command Sgt. Maj. David Rogers**, USAMRMC and Fort Detrick command sergeant major, center, participated in the ceremony.

Bailey's most recent role was deputy program manager for the Joint Operational Medicine Information Systems Program Office, where he was responsible for the centralized acquisition management and integration of two major automated information system programs supporting the configuration and deployment of the new electronic health record for operational forces. He has served in numerous acquisition and medical logistics positions at the tactical, operational and strategic levels of the Army. A member of the Army Medical Service Corps, Bailey holds an MBA in supply chain management from the Naval Postgraduate School and a BBA in marketing from North Georgia College. (U.S. Army photo by Thom Jester, Fort Detrick Directorate of Plans, Training, Mobilization and Security)

3: CCCRP APPOINTS NEW DIRECTOR

U.S. Air Force **Col. (Dr.) Michael R. Davis**, assumed the directorship of USAMRMC's Combat Casualty Care Research Program (CCCRP) at Fort Detrick, Maryland, in June. His assignment follows a nearly four-year appointment as deputy commander for the U.S. Army Institute of Surgical Research in San Antonio. As CCCRP director, Davis' chief responsibility will be to create mid- and long-term plans for developing materiel and knowledge products to close capability gaps in military trauma care. (U.S. Army photo)

U.S. ARMY MISSION AND INSTALLATION CONTRACTING COMMAND

4: CHANGE AT MICC CAPS 31-YEAR CAREER

Col. William Boruff, left, received the U.S. Army Mission and Installation Contracting Command (MICC) colors from **Maj. Gen. James E. Simpson**, commanding general of the U.S. Army Contracting Command, during a change of command ceremony July 26 at Joint Base San Antonio – Fort Sam Houston, Texas. Boruff assumed command from **Brig. Gen. Jeffrey A. Gabbert**, who retired from the Army after 31 years of service. Boruff comes to MICC from Washington, where he served as chief of the Capabilities and Acquisition Division for the Joint Chiefs of Staff Force Structure, Resources and Assessment Directorate.

In his three decades as an Army officer, Gabbert held a variety of leadership positions in acquisition program management and contracting, including chief of staff for the assistant secretary of the Army for acquisition, logistics and technology; chief of staff at U.S. Army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Contracting Command; and multiple command positions in the Defense Contract Management Agency. In various capacities, he also supported the Apache and unmanned aerial vehicle project management offices of the U.S. Army Aviation and Missile Command and the Program Executive Office for Aviation, respectively.

Gabbert deployed to Operation Iraqi Freedom and operations Desert Shield and Desert Storm. His awards and decorations include the Defense Superior Service Medal, Legion of Merit (with one oak leaf cluster), Bronze Star Medal (one oak leaf cluster), Defense Meritorious Service Medal, Meritorious Service Medal (three oak leaf clusters), Army Commendation Medal and Army Achievement Medal (three oak leaf clusters). Before the change of command, Simpson presented Gabbert the Distinguished Service Medal. Gabbert's wife, Doreen, was presented the Commander's Award for Public Service and a certificate of appreciation from the U.S. Army Materiel Command. (U.S. Army photo by Jerry Wright, MICC)

U.S. ARMY SECURITY ASSISTANCE COMMAND

5: NEW CSM FOR USASAC

Command Sgt. Maj. Gene E. Canada, left, assumed responsibility as the U.S. Army Security Assistance Command (USASAC) senior enlisted adviser in July, receiving the colors from **Maj. Gen. Stephen E. Farmen**, USASAC commanding general. Canada is USASAC's third command sergeant major (CSM), succeeding **Command Sgt. Maj. Dana S. Mason Jr.**, right, who relinquished responsibility in June. Canada was previously the CSM for the Installation Management Command Directorate – Europe. (U.S. Army photo by Michelle Miller, USASAC)

6: CHANGE OF COMMAND AT USASATMO

Col. Eric C. Flesch assumed command of the U.S. Army Security Assistance Training Management Organization (USASATMO) from **Col. Gerald A. Boston** at a July 7 ceremony hosted by **Maj. Gen. Stephen E. Farmen**, commanding general of USASAC, of which USASATMO is a subordinate command. Flesch previously served as chief of staff for Special Operations Joint Task Force and NATO Special Operations Component Command – Afghanistan. Boston moves to the U.S. Army Training and Doctrine Command Capability Manager for Armored Brigade Combat Team and Reconnaissance at the U.S. Army Maneuver Center of Excellence. (U.S. Army photo)

OFFICE OF THE CHIEF OF STAFF, ARMY GENERAL OFFICER ANNOUNCEMENTS

The chief of staff, Army, announced the following officer assignment:

Maj. Gen. Wilson A. Shoffner Jr., director of operations and director, rapid equipment fielding, Army Rapid Capabilities Office, Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology, Washington, to commanding general, U.S. Army Fires Center of Excellence and Fort Sill, Oklahoma.

The following officers were confirmed by the Senate for promotion to the rank of major general:

Brig. Gen. Patrick W. Burden, currently serving as program executive officer for enterprise information systems, Fort Belvoir, Virginia.

Brig. Gen. Brian P. Cummings, currently serving as program executive officer for Soldier, Fort Belvoir, Virginia.

The following general officers were promoted to the rank indicated below:

Brig. Gen. Alfred F. Abramson III, currently serving as deputy program executive officer for ammunition and senior commander of Picatinny Arsenal, New Jersey.

Brig. Gen. Robert A. Rasch Jr., currently serving as deputy program executive officer for missiles and space, Redstone Arsenal, Alabama.

SES ANNOUNCEMENTS

The secretary of defense announced the following Senior Executive Service (SES) appointment and assignment:

Stuart A. Hazlett, director of contracting, U.S. Army Corps of Engineers, Washington, to deputy assistant secretary of the Army for procurement, Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology, Washington.

Molly L. Walsh, for appointment to the SES and assignment as the senior adviser to the undersecretary of defense for acquisition, technology and logistics. Walsh most recently was a senior policy and research analyst at the Logistics Management Institute, where she provided strategic guidance and policy support to government clients including DOD and the U.S. Department of Homeland Security.

THEN & NOW
1966, 1990, 2017

DECADES TO 'ZAP'

The theoretical possibility of a silent beam of energy that turns enemy weapons to toast has been explored in the pages of AL&T magazine for decades. With high-energy lasers on Stryker combat vehicles and an Apache helicopter downing drones in tests, it now seems a matter of time before they're in use in the field.

Lasers, synonymous with precision from eye surgery to targeting, have long held out the possibility of an elegant and cheap solution to some of the messier, more expensive problems of war. A bomb is a single-use weapon; a laser is reusable. A laser weapon can disable a vehicle at a distance without blowing it up, preserving lives and intelligence, and can do a host of things a bullet can't, or that a bullet can do but with a big risk of collateral damage. It can blind a surveillance camera, disable communications networks, shoot down a rocket fired from an approaching boat.

A laser weapon needs a lot of power but doesn't need ammunition, which frees up a whole chain of resources. No need for bullets means fewer vehicles in a supply convoy and less storage space needed. Theoretically, a weapon that travels at the speed of light could also shoot down a missile traveling faster than the speed of sound, boosting the ability of current missile defense systems to intercept new hypersonic missiles.

These benefits eluded the defense community for decades. In the July-August 1966 issue, Army AL&T predecessor Army Research and Development Newsmagazine ran a summary of a paper presented at the Army Science Conference by Feltman Research Laboratories exploring the ability of chemical reactions to power a laser beam. "The detonation of a cyanogen-oxygen mixture in small test vehicles looks promising as a pump with military applications," the article noted.

Interest in and the feasibility of laser weapons has waxed and waned since then, and the magazine archives chart this: In a May-June 1976 article, Dr. George H. Heilmeier, then-director of the Defense Advanced Research Projects Agency (DARPA), said that whether the Soviets could use lasers to disable the American satellite network was the No. 1 question DARPA was exploring. Tangential references to directed-energy weapons (the technical name for high-energy laser weapons) and particle beams crop up throughout the '70s and '80s. In the July-August 1990 issue, Army Research, Development and Acquisition

Bulletin, in a comprehensive survey of Army technology, named directed-energy weapons as one of 13 key fields where the Army needed to invest in the technology base's ability to do research. This list was prompted by real fears that the United States was close to permanently surrendering the technological advantage to the Soviet Union.

Of course, during this time low-energy lasers became common across all kinds of weapon systems to mark targets and guide conventional ammunition. But high-energy lasers that don't just guide another weapon but are the weapon themselves remained elusive.

Now, though, the Army has high-energy lasers zapping test targets from multiple platforms. (For reference, a 5-kilowatt laser is equivalent to about 5 million handheld laser pointers.) In Army tests, directed-energy weapons have been mounted on helicopters and cargo trucks and have melted truck engines from a mile away, as well as drones, laptops, small-caliber mortars and other projectiles. "The technology is coming of age as a realistic solution for ground platforms against small, close-in threats," such as boats and drones, said Paul Shattuck, director of Lockheed Martin Space Systems Co., in an interview with Defense Systems published in June 2016.

THE SCIENCE IS THERE

It has been a long time coming. "We first determined we could use lasers in the early '60s. It was not until the '90s when we determined we could have the additional power needed to hit a target of substance. It took us that long to create a system and we have been working that kind of system ever since," Mary Miller, then-deputy assistant secretary of the Army for research and technology, told military-news website Scout Warrior in 2016.

Over those years, the focus shifted from chemical lasers, which are cumbersome—a Boeing 747 carried the military's last chemical laser—and risk toxic spills, to the more stable solid-state fiber laser, generated by fiber optics. "That's one of the advantages of a fiber laser; you can dial the effect by applying more or less power. As an example, we can vary power to blind a camera on a drone, take out the camera or bring down the entire drone," Shattuck noted.

Industry and DOD experts alike agree that the science is there to operationalize directed-energy weapons. The U.S. Navy's amphibious transport dock USS Ponce has carried a 30-kilowatt laser weapon system known as LaWS since 2014 for testing. (Because a laser weapon draws a lot of power, larger platforms like ships and planes were a more obvious starting point than most Army vehicles.) It's effective against drones and small vessels, but it would need more kilowatts to defend against anti-ship missiles; the Navy awarded Northrop Grumman Corp. a $91 million contract in 2015 to develop the next generation of the system, with a goal of demonstrating a 150-kilowatt seaborne weapon in 2018.

The more kilowatts a laser has, the faster it can burn through targets, the better it can pierce through obscurants such as dust, smoke and fog, and the better chance it has of burning through any reflective material (like a mirror) protecting a target.

TOASTED

Adam Aberle, High Energy Laser Mobile Test Truck program manager with the U.S. Army Space and Missile Defense Command/ Army Forces Strategic Command, displays an unmanned aerial vehicle hit by a compact laser weapon system during the Maneuver Fires Integrated Experiment at Fort Sill, Oklahoma, in April 2016. Participation in the exercise marked a significant milestone: the weapon system's ability to integrate with other military equipment and perform effectively during a combat situation. (Photo by Monica K. Guthrie, Fort Sill Public Affairs)

X MARKS THE SHOT

Spc. Brandon Sallaway, fire support specialist and forward observer with the 2nd Battalion, 12th Field Artillery Regiment, points to a sticker on a Stryker equipped with the Mobile High-Energy Laser (MEHEL), which he helped evaluate in April at the Maneuver Fires Integrated Experiment at Fort Sill. The stickers represent the number of drones the MEHEL has hit, and Sallaway was the first Soldier to use the weapon to take down a target. (Photo by C. Todd Lopez, Army News Service)

U.S. Air Force transport planes are fitted with lasers as an infrared countermeasure, as are U.S. Marine Corps CH-53 helicopters.

It appears to be a toss-up whether money or power is the biggest remaining challenge to getting directed-energy weapons onto the battlefield. Directed-energy weapons require a lot of … energy. To produce a 150-kilowatt beam, for instance—what researchers think is necessary to begin to counter aircraft and cruise missiles from farther away—requires 450 kilowatts of power. How to generate enough power without making the weapon too big to mount on any platform is a persistent stumbling block, though certainly not unique to laser weaponry. How to store that power for mobile weapons is a second hurdle.

Lasers are expensive to develop, though cheap to use once developed. In 2012, DOD retired the Airborne Laser Testbed, its last effort to weaponize chemical lasers, in favor of lasers powered by more renewable means, after spending $5 billion. The high-energy laser weapon system that the USS Ponce carries was part of a $40 million research effort. But Navy officials estimate that each shot of the laser weapon aboard the USS Ponce costs 59 cents, for example, compared with the hundreds of thousands of dollars it costs to fire a standard missile interceptor or the approximately $115,000 for each HELLFIRE missile dropped from an Apache helicopter.

FROM LAB TO TEST

Over the past three or four years, the Army has gotten pretty good at shooting down drones with increasingly powerful laser weapons mounted on ground vehicles, as the result of several programs: the High Energy Laser Mobile Test Truck, for which Boeing Co. mounted a 10-kilowatt laser on a heavy cargo truck; and the Mobile High-Energy Laser, which was the first integration of a high-energy laser onto an Army combat vehicle. The Stryker-mounted 5-kilowatt laser weapon took down about 50 drones in an April 2016 test at Fort Sill, Oklahoma.

"We did a lot of preparation … seeing if we could track the airborne targets among ground clutter," Adam Aberle, who runs high-energy laser technology development and demonstration for the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command, told defense reporters after the demonstration at Fort Sill. "We absolutely blew lots of stuff up."

The next frontier in terms of platforms appears to be airborne laser weapons. On June 27 at White Sands Missile Range in New Mexico, a laser weapon on an Apache helicopter shot down an unmanned target during a collaborative test run by Raytheon Co., U.S. Special Operations Command (USSOCOM) and the Army's Apache Program Management Office. The kilowattage of the laser used wasn't released, but this test was news for several reasons.

For one, the dust stirred up by a helicopter's rotating blades makes it harder for laser beams to hit targets. Hitting a target from a moving platform is difficult, and a moving platform that also vibrates, as an attack helicopter in flight does, adds another level of difficulty, since a laser beam needs to be held steady on the target for seconds. (How long exactly depends on the kilowattage of the laser beam.) Clearly, technical progress has been made.

Research efforts also focus on increasing the kilowattage and ability to control the beam of directed energy so as to hit not

KEEP A SAFE DISTANCE

The Zeus-High Mobility Multi-purpose Wheeled Vehicle provides laser capabilities for unexploded ordnance and mine-clearing operations. The solid-state laser system allows Soldiers to stay up to 200 meters away as they clear suspected hazards. (U.S. Army photo)

just cheap quadcopters but also aircraft, cruise missiles, armored targets and, someday, ballistic missiles (tricky, since ballistic missiles bear a heat-resistant coating to prevent them from burning up when they re-enter the atmosphere).

What's coming in 2018? Lasers on big vehicles, lasers on medium-sized vehicles and presumably more lasers on helicopters, for the Army. In FY18, the High-Energy Laser Mobile Test Truck, a converted 34-foot-long Heavy Expanded Mobility Tactical Truck, should have a 50-kilowatt laser aboard and ready for demonstrations. By the end of FY17, the Army expects to select a contractor to mount a 100-kilowatt laser weapon on a more mobile vehicle like a Stryker or Bradley—a request from Soldiers in the field—for testing by 2022. The Air Force and USSOCOM plan to test a directed-energy weapon mounted on an AC-130 gunship by the end of the year.

By 2020, General Dynamics Land Systems, which builds the Stryker vehicle, expects to be able to fire a 30-kilowatt laser from a Stryker. Considering that 30 kilowatts currently requires a 570-foot-long ship with four electrical power generators to support, that's quite an advancement. Leaps in capability don't just happen, though; they take decades of research and development.

CONCLUSION

Money spent in the 1970s now looks likely to pay off in the 2020s, in terms of a product in the field. Research conducted with the massed forces of the Soviet army in mind now looks like it will be most useful, at least in the short term, against cheap, low-flying drones, often flown by nonstate actors.

A ready force requires an acquisition and technology community capable of responding to "we need it now" requests like the mine-resistant, ambush-protected vehicle and the up-armored High Mobility Multipurpose Wheeled Vehicle, while sustaining much longer-term thinking. The lesson is one most observers of the defense scene already know: It can take a long time and some expensive failures to move from promising idea to program of record, from a technically possible capability to a tool in the warfighter's hands.

For a historical tour of Army AL&T over the past 57 years, go to the Army AL&T archives at ***http://asc.army.mil/web/magazine/alt-magazine-archive/****.*

—MS. MARY KATE AYLWARD

15 short years ago, on June 7, 2002, Program Executive Office Soldier became a reality. With the mission to support the Soldier, PEO Soldier was the first organization in U.S. Army history that factually claimed to modernize the "Soldier as a System." We deliberately integrated technologies for the Soldier as well as becoming the focal points to develop, produce, field, and sustain everything that the Soldier "wears, carries, and operates."

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From 2002-2016, PEO Soldier fielded more than 98 million items to Soldiers, which included weapons, integrated soldier systems, protective equipment and clothing, ammunition packs and enhanced first aid kits, counter unmanned aerial systems, night vision devices, thermal weapon sights, and laser designation systems.

CONGRATULATIONS PEO SOLDIER ON 15 YEARS!
WE LOOK FORWARD TO MANY MORE!

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"The only thing more expensive than deterrence is actually fighting a war, and the only thing more expensive than fighting a war is fighting one and losing one."

Gen. Mark A. Milley
Army Chief of Staff

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