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# ARMY AI&T

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SUMMER 2019

## DATA FROM THE FOXHOLE TO THE PENTAGON

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## From the Editor-in-Chief

**D**ata, data everywhere and not a datum to analyze (with apologies to Samuel Taylor Coleridge’s “The Rime of the Ancient Mariner”). We are awash in data today. Your cellphone tracks your steps; satellites give your exact location on Earth; your car sends updates on oil changes; and your credit cards monitor your spending habits—and that’s just you. Imagine you’re in business and you need to know the latest costs of goods, shipping and labor, not to mention customer purchasing habits, exchange rates, taxes, etc. You can track that! (How do you think Walmart Inc. or Amazon.com Inc. “suggests” what you might want to buy, or a Facebook ad pops up with just what you didn’t know you needed? Data.)

Now, imagine you’re running the largest organization in the world, the Department of Defense, with more than 3 million people and a budget in excess of \$700 billion per year. You need to make smart decisions on what to buy, what to make, pay raises, incentives, operating costs, and at every turn you need to be as efficient as possible with the taxpayers’ money. How? Data, or, more precisely, the facts or pieces of information we collect on everything from research, development, testing, engineering, contracting, maintenance and sustainment, to workforce skills, fund execution rates and program execution status—everything can be and is a data point.

And now, the rub: To make the best decisions based on data, you have to know what data you want, where it is, how to gather it and how to analyze it. You also need to make sure the data you get is “authoritative”—reliable and accurate. And, for the military, there’s one more hurdle—there are thousands upon thousands of data systems, and literally millions of users. Linking these systems and ensuring that the data is refreshed and maintained properly, entered correctly (no text where a number should be, or vice versa) and useful is a huge challenge. As Dr. Bruce D. Jette, the Army acquisition executive (AAE), points out in his column on Page 4, a great deal of data that the Army needs resides in spreadsheets on individual computers that aren’t part of a larger data system.

As with most things, the Army has a plan for getting data under control and using it to make the best decisions possible, and that is the focus of this issue: Army data from the foxhole to the

Pentagon. The AAE is working to create a holistic life cycle for acquisition data, and his office is developing the acquisition data domain. Maj. Mario Iglesias has the inside story on the domain’s development in “Data Is Decisive” on Page 8.

Find out how this framework will drive better decision-making. Then, see how Army leaders might use all this data in the newly created Army Leader Dashboard (“Creating Insight-Driven Decisions,” Page 14). Also, Dr. Dan Stimpson from the office of the Army’s Director, Acquisition Career Management offers a thought-provoking look at the limitations of data, in “So Much Data, So Little Time” on Page 122.

It’s not all about the data, though. In our continuing series, “ASA(ALT) at Work,” we have a fascinating profile on Page 22 of the Program Executive Office for Enterprise Information Systems, which is rolling out the Army’s new integrated pay and personnel system, and working to provide a dashboard whereby Army leaders can get the information they need about acquisition programs.

From one of the many authors with doctorates in this issue comes a provocative commentary from Dr. Gordon Cooke of West Point, formerly of the U.S. Army Research, Development and Engineering Command. In “Magic Bullets” on Page 116, he looks at the future of artificial intelligence-powered weapons and the moral and ethical implications therein.

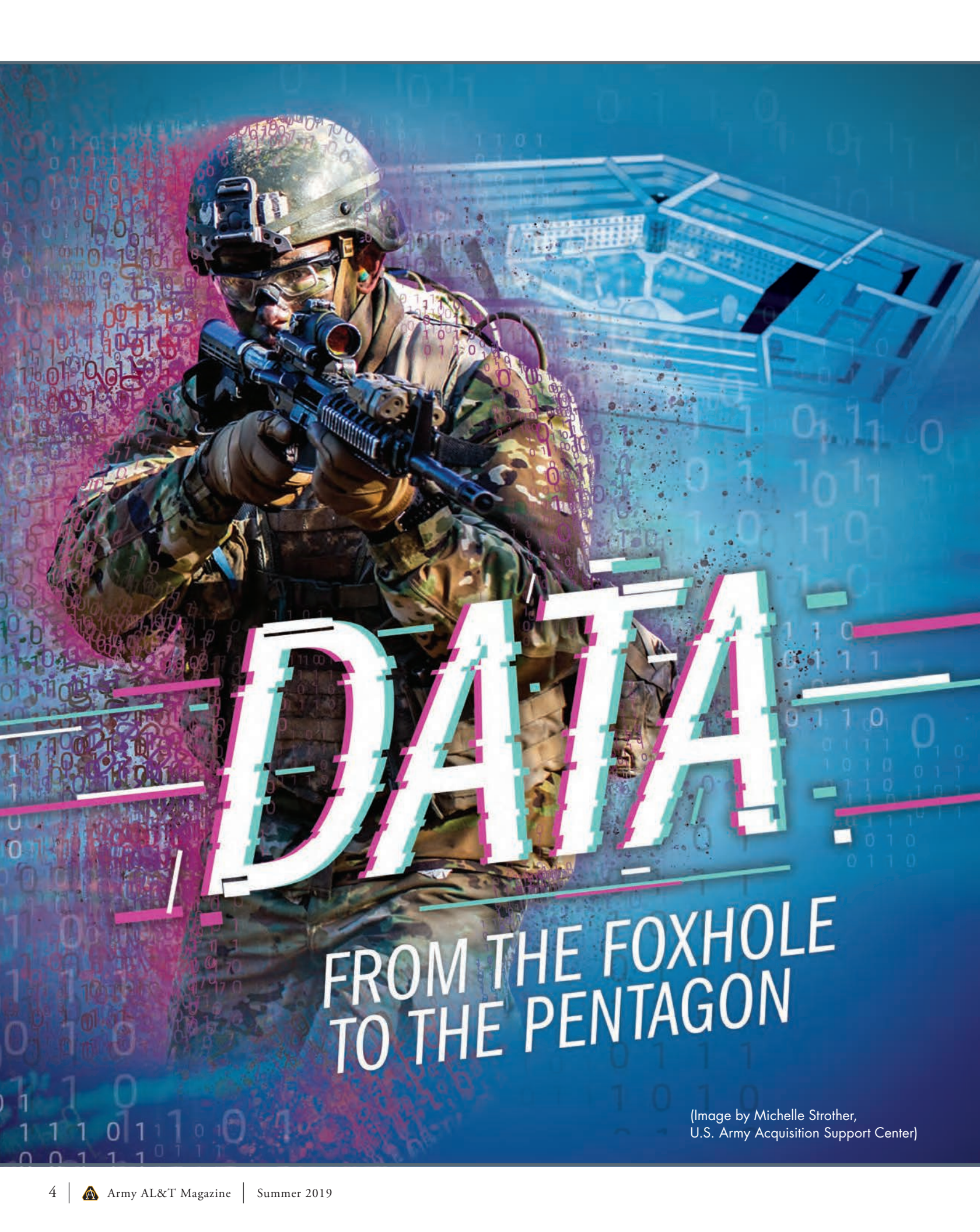
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*Nelson McCouch III*  
*Editor-in-Chief*





# DATA

FROM THE FOXHOLE  
TO THE PENTAGON

(Image by Michelle Strother,  
U.S. Army Acquisition Support Center)





# THE ZEN OF DATA

Managing data holistically from the foxhole to the Pentagon enables better decision-making.

**T**he old saying is that “an army runs on its stomach,” but that’s not quite the case anymore. With our feet firmly planted in the digital age, our Army doesn’t run on its stomach—it runs on data.

Currently the acquisition community has no enterprise-wide tools for managing Army acquisition-related data such as financial information, system requirements, logistics or schedules. The execution of billion-dollar programs is maintained on isolated Excel spreadsheets of program and budget analysts. When senior decision-makers need information, they have to send a request through their chain of command. That request then gets consolidated over the course of days and weeks by various headquarter elements until the needed information is sent back up the chain. It takes too much time. At present, there is no efficient and effective way to store and share the data that leaders need when they need it. We are changing that.

Commercial companies such as Amazon and Google and the financial industry have demonstrated that current and emerging technologies make data management critical to being an industry leader. Now is the time for Army acquisition to invest in the tools and governance structures that will facilitate a data culture transformation in the Army.

I believe effective data management is one of the keys to successfully rationalizing Army data—in other words,

grouping related data fields into tables, determining key fields and then relating those tables using common key fields. Efficient access to the right data allows Army leaders to make better, well-informed decisions. But to achieve effective data management, we need to change the way we conduct business—change our culture—from the executive level at the Pentagon to the Soldier in the foxhole.

## HOLISTIC DATA

Data is defined as factual information used as a basis for reasoning, discussion or calculation. It is invaluable, but only if it is collected, managed and maintained properly. Without effective data management, our business processes could experience a dependability breakdown—there could be dozens of needlessly duplicated processes, products could be wildly over budget and anything that’s measured in numbers, like how many tanks are operationally ready, could be totally inaccurate.

The Army is an enormous entity, and the amount of data it generates is staggering. The acquisition enterprise itself is no small part of that, and we’re aiming to have a holistic approach to managing data. It is absolutely imperative.

Right now, data is stored in many different locations—in various clouds or on many different servers—and isn’t particularly accessible to those who may need it; it’s siloed. In other words, we have different datasets in different places, and no



way to share or access them easily when we need them. Many “authoritative data” may be in conflict with other “authoritative data.” Managing data holistically means:

- Having a single owner of any particular data (file, data field and data fill).
- Having only one authoritative instance of any particular data.
- Authority for access to and use of, including managed replication and data entry, any authoritative particular data.
- Procedures for use, access, management, control, update and entry.
- Relational database structure. A relational database stores data in tables; data can be accessed or reassembled from these tables in many different ways without having to reorganize them. The result is to interlink data, make it flexible for users and eliminate data duplication.

Once this is accomplished, linking different datasets can form the “big picture” of acquisition and begin securing that data.

We need a plan to implement data in a holistic data life cycle, with three major phases:

**Data collection.** Quality data is gathered from across the acquisition enterprise at all levels, either by manual or—in the future—automated entry. The objective is to automate conveniently and simply at the lowest level possible, to provide insight when consolidated without further intervention.

**Data integration and interpretation.** The datasets are quickly and easily accessible to those who need and are authorized to use them. They provide accurate, actionable information.

**Data maintenance.** Data is archived, auditable and secured, at rest and in



## ACCESS TO ALL DATA

The acquisition data domain will give Army acquisition leaders comprehensive information on the Army’s modernization programs, among others, through data entry, data management and data-driven decisions. (Image by sorbetto/Getty Images)

transport, to ensure that it is usable in the long term and protected from internal and external threats, such as ransomware. Auditability will ensure traceability, facilitate forensics and help eliminate insider threats.

It is important that the entire acquisition community participate in the holistic data management approach for it to work most effectively. At the tactical level, this means entering timely, accurate, quality data into your collection system. From the supervisory or strategic level, it means reviewing the data for current applicability. At the senior leadership level, this means using the data to make well-informed, near- and long-term program decisions as well

as applying it to the modernization of the future force. It means, from the assistant secretary of the Army for acquisition, logistics and technology level, developing and implementing an achievable implementation plan.

## ACQUISITION DATA DOMAIN

My office is developing the acquisition data domain, which will be a significant framework for holistic and effective data management. “Data Is Decisive,” on Page 8.) It will allow Army acquisition leaders to have comprehensive information on all aspects of the Army’s modernization programs through three tiers: data entry, data management and data-driven decisions:

**Data entry and capture.** Thorough identification and capture of authoritative, appropriate data is the key to success in the first tier of the domain. The goal for initial data entry is to automate the collection of data as it is being generated at the working level. At most, users will enter data once and it will be pulled into a central data repository, which will allow access for many other people and organizations based on their responsibilities. The key to making data entry efficient and authoritative will be identification and adoption of tools that help those at the working level to conduct daily business and satisfy requirements.

**Data management system (DMS).** This second tier will link different datasets across functions, weapon systems and phases of an acquisition program life cycle. It will capture, store and manage data from program conception to divestiture. The creation of the DMS is the boldest and most complex portion of this vision. The various Army programs and systems begin generating data as the concept is born and continue through development, production and sustainment up to divestment.

Within each phase of the life cycle, there are different data subdomains such as

**At present, there is no efficient and effective way to store and share the data that leaders need when they need it. We are changing that.**



### A THREE-PHASED PLAN

Army acquisition needs a plan to implement a holistic data life cycle, with three major phases: data collection, data integration and interpretation, and data maintenance. (Image by sorbetto/Getty Images)

finances, schedules, performance specifications, requirements and logistics. Program interdependencies will require the DMS to identify and link the cost, schedule and performance requirements between the programs. Once these datasets have been developed and linked, Army leaders will be able to use analytical tools to make better decisions.

**Data-driven decisions.** The third tier will require the identification and development of data analysis tools to assist leaders with decision-making and resource planning. The tools will likely use technologies such as artificial intelligence and machine learning to identify life cycle red flags early—like overspending and production delays. Learning about those indicators early will help program managers deliver quality products on time and

on budget, and will allow senior leaders to make better decisions on current and future modernization programs.

### CONCLUSION

Effective data management will be the key to efficient business operations in the future. This is another case where we benefit by looking to industry and emulating their success. If we use all the resources at our disposal, such as artificial intelligence and industry's example of effective data management, we can ensure a future acquisition enterprise in which business processes are truly streamlined, with programs and products practically always guaranteed to be delivered on time and on budget. In the end, our Soldiers will be the beneficiaries.

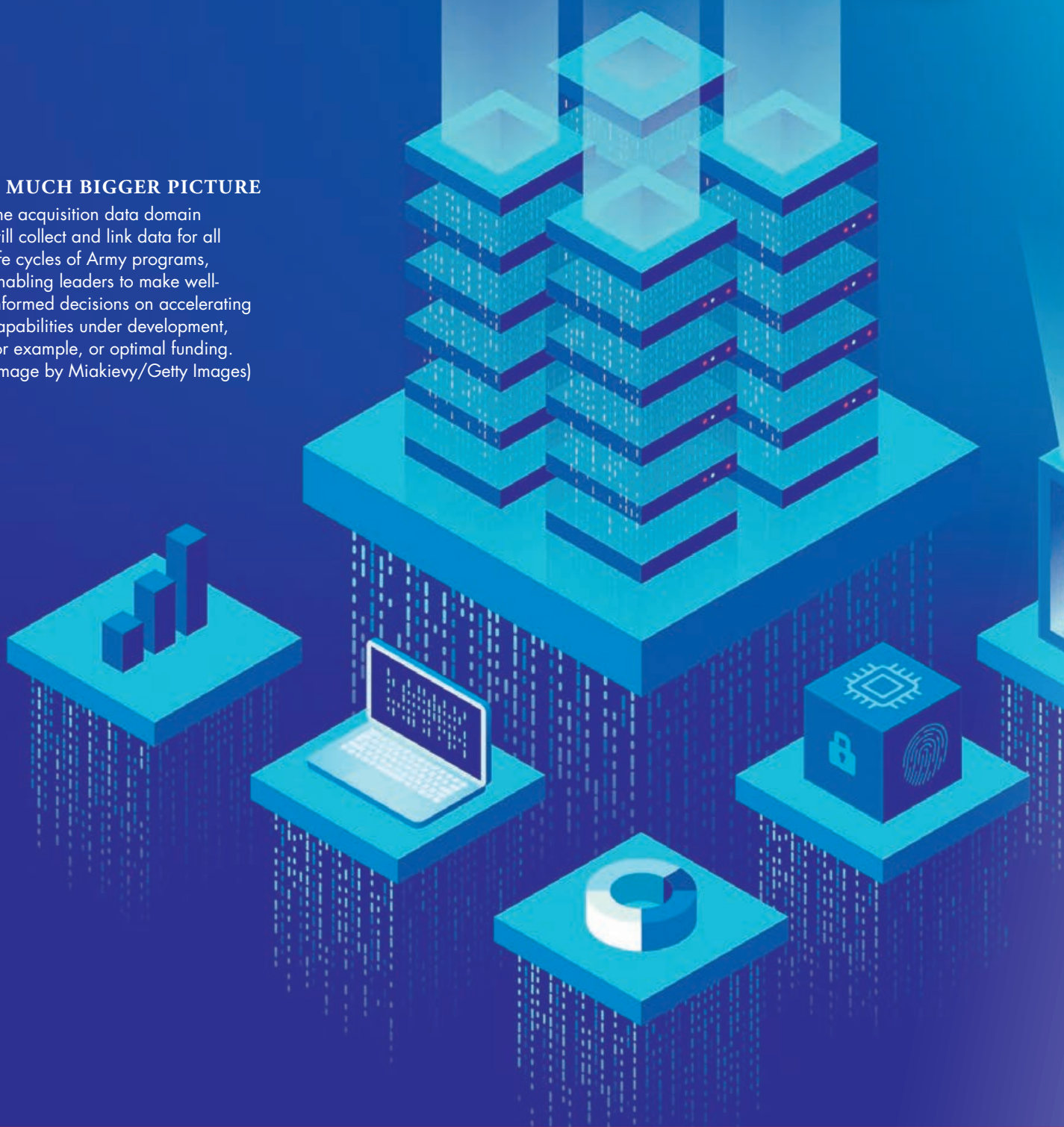





# DATA IS

## A MUCH BIGGER PICTURE

The acquisition data domain will collect and link data for all life cycles of Army programs, enabling leaders to make well-informed decisions on accelerating capabilities under development, for example, or optimal funding. (Image by Miakievy/Getty Images)



# DECISIVE



From Sun Tzu to machine learning, having good data is more than half the battle. The Army's acquisition data domain promises to prove that once again.

*by Maj. Mario Iglesias*

In the year 500 B.C., the Chinese philosopher-general Sun Tzu stated, "If you know the enemy and know yourself, you need not fear the result of a hundred battles." Sun Tzu understood how properly using data allowed leaders to make critical decisions leading to victory or defeat. Fast-forward to the present day, and the importance of synthesizing data continues to grow in modern militaries. Gen. Mark A. Milley, chief of staff of the Army, highlighted that lesson from Sun Tzu when he said that the Army lacks "the ability to see self."

He and other senior leaders throughout the Army understand that accessing, visualizing and leveraging data has become a mission-essential task. Milley's statement in November 2017 launched the Army Leader Dashboard, a system designed to enable senior Army leaders to see data on all aspects of the Army, from personnel to logistics to acquisitions. (See "Creating Insight-Driven Decisions," Page 14.) The ongoing development of the dashboard has highlighted holes in our current data map, one of the largest gaps being the data surrounding our acquisition programs.



All of defense acquisition is characterized by the constant gathering of data. Every bit of a program must be documented, from need statement to requirements to every step of development. Every program has reams of data. Yet it has never been collected and managed at the enterprise level in any automated or systemic way.

The Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (OASA(ALT)), for example, has always required programs to provide data for milestone decisions and in response to requests for information made by leaders and decision-makers. The milestone decision authority will require updated cost estimates, test data and a detailed schedule before approving a program's advance to the next phase of its acquisition life cycle.

**The development of an automated system will allow for users at all levels to begin leveraging data throughout the acquisition enterprise to conduct their jobs more effectively.**

Such data is collected, analyzed and provided in an easy-to-understand manner for the milestone decision authority and other stakeholders so they can confidently assess that the program should continue development and fielding. However, the acquisition community has lacked common tools across the enterprise that can store and provide the data for the dashboard to ingest before or after these milestone events. This is a problem for acquisition leaders and resource managers who need programmatic data at all points of a program's life cycle. This clear gap is both a challenge and an opportunity for the acquisition community to finally develop the tools that will fill the data gap and allow current and future leaders to make better decisions.

### **BUILDING THE ACQUISITION DATA DOMAIN**

Dr. Bruce D. Jette, the Army acquisition executive, has developed the framework for the Army's acquisition data domain, which will be how the Army identifies, collects, manages and analyzes data throughout all Army programs' life cycles—what it will look like and how it will function. (See Figure 1, Page 12.) The acquisition data domain will collect and link data from a program's inception as an idea through its development, production, fielding, sustainment and demilitarization. The larger domain will then interlink these subdomains so that leaders can understand the impacts of accelerating or divesting capabilities that are being developed.

Without such data, the acquisition community will not begin to leverage advanced analytical tools, such as artificial intelligence or machine learning. To do so, it needs access to the structured data that makes up programs. Building the acquisition data domain will require significant shifts in the business processes and tools

that are used for all aspects of program management.

### **PROGRAM TOOLS**

Last August, the Office of the Deputy Assistant Secretary of the Army for Plans, Programs and Resources began a pilot program to build the business management portion of the acquisition data domain. It is currently piloting the Air Force-developed system known as Project Management Resource Tools (PMRT). The PMRT system has been in use for more than 20 years, and comprises multiple modules for managing and visualizing programmatic and financial data.

The benefits of using a tool that another service has developed are the “speed to market” and design maturity. PMRT is already approved to operate on the Army network and is vertically aligned with Office of the Secretary of Defense reporting requirements.

Many of the program offices are currently using Microsoft Excel to manage billion-dollar programs. PMRT will replace these inaccessible spreadsheets and automate the way program offices manage their finances. However, some program offices and program executive offices (PEOs) have tools for managing their financial data. ASA(ALT) will work with these program offices to incorporate data into PMRT when possible. Moving from no tools—or several sets of tools—to a single tool used Armywide will mark a major cultural shift.

### **DATA CULTURAL SHIFT SPANS ALL LEVELS**

The data transformation within the acquisition community will succeed only if the community, at all levels, actively takes part in the cultural shift. It will require users in the program offices to change tools and business processes while leaders



### HIGHER-LEVEL ANALYTICS

Beyond establishing a useful, efficient framework for the Army to identify, collect, manage and analyze data throughout all Army programs' life cycles, the acquisition data domain will allow the acquisition community to leverage advanced analytical tools, such as artificial intelligence or machine learning, for cutting-edge data management. (Image by U.S. Army Acquisition Support Center (USAASC)/Ryzhi/Getty Images)

at the executive level learn how to leverage the data that is being collected.

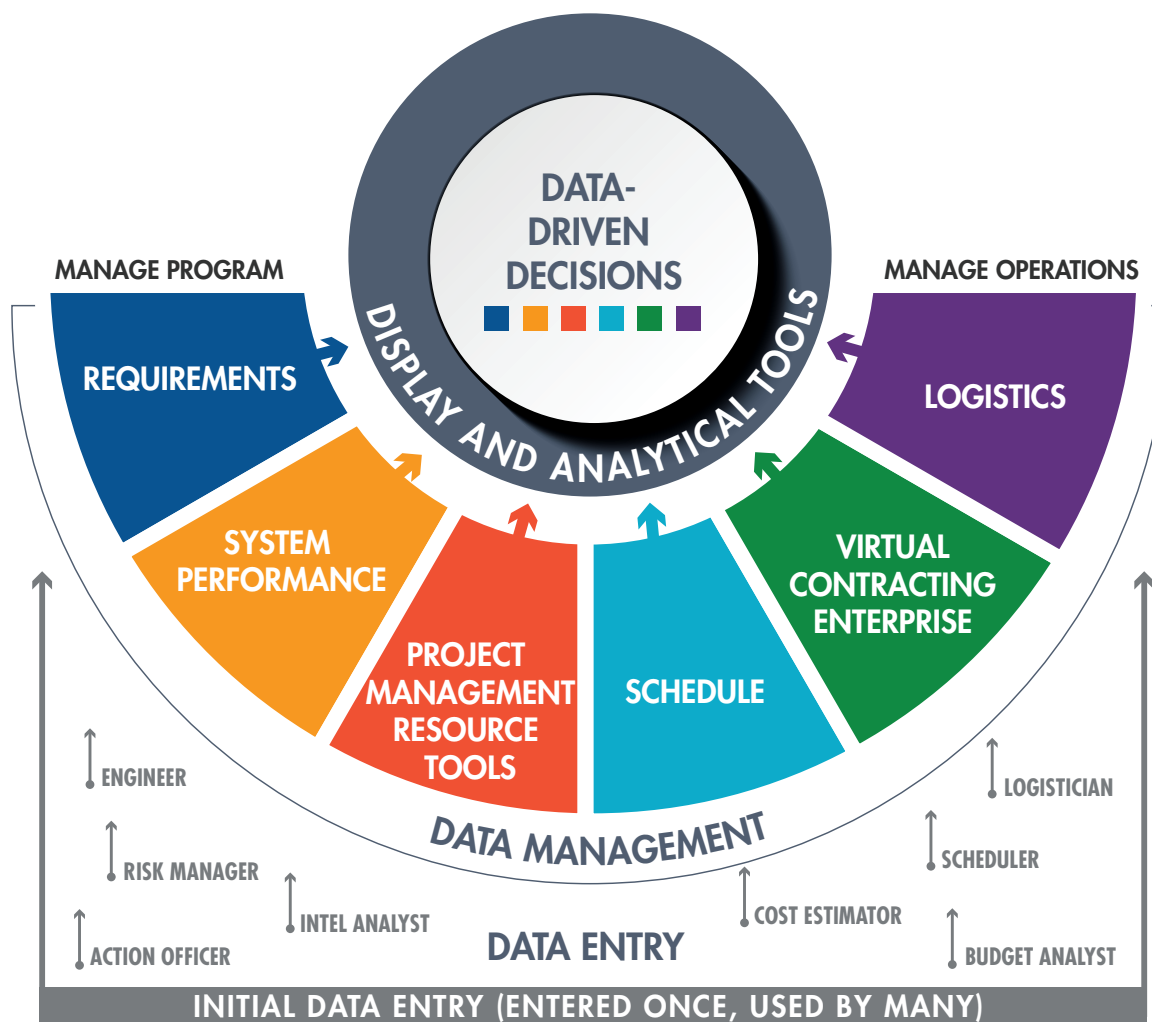
At the program office level, individuals must change how they conduct business and use the tools that will capture data as they work. The data in the system will only be useful to decision-makers if it is timely and accurate. Changing the tools and processes will inevitably incur a transition cost, such as for training and business process re-engineering, but it will be imperative for the success of these efforts. As trust in the tools grows, the number of requests for information that inundate the program offices will be dramatically reduced.

At the staff level, PEO and ASA(ALT) staffs will need to learn how to use the new data tools to collect information quickly without interfering with the program offices' work. Additionally, the domain managers will need to identify and adopt tools that will encourage program offices to use them. They also generally must be easy to use at various levels.

At the executive level, senior leaders will need to receive their information from the tools on the system. All of their briefs and updates on programs and initiatives should be sourced from the various data tools that program offices and staffs are managing. Leadership also will need patience and understanding, as there



FIGURE 1



### CONNECTING THE DATA

By enabling program officials to successfully rationalize Army data across programs' life cycles—that is, to group related data fields into tables, determine key fields and then relate those tables—the acquisition data domain will provide them efficient access to the right data at the right time. (Graphic by USAASC; SOURCE: ASA(ALT))

will be a learning curve and problems associated with using the new data tools. Additionally, leaders must leverage the data populated in the standardized reports to reduce rework by the staff.

### TRANSFORMING DATA CULTURE

People who have been in ASA(ALT) for a while may have seen other efforts to transform how the organization uses data start and fail. The recent sunsetting of the Product Manager for

Acquisition Business is the latest casualty in a list of ASA(ALT) data missteps. It is fair to ask how this new effort will be different from previous failed attempts. The answer is, there are a number of significant factors that will separate this effort from others:

**Senior leader support.** Reforming how the acquisition community makes decisions based on data is a top priority for the current ASA(ALT). Jette has maintained a focus on improving

## Every program has reams of data. Yet it has never been collected and managed at the enterprise level in any automated or systemic way.

the way the organization uses data. His involvement ensures that the acquisition data domain initiative will receive the resources and advocacy necessary for making a large organizational change. Previous efforts did not have this continued senior leader involvement.

**Learning from successful transitions.** ASA(ALT) can benefit greatly by learning from commercial companies that have made large-scale, successful transitions. Recently ASA(ALT) hired McKinsey & Co., an international consulting firm, to develop a road map for building an ASA(ALT) data team and a detailed plan for realizing the acquisition domain. McKinsey has successfully completed similar projects with leading financial and telecommunication companies.

**Technology advances.** Over the last decade, there have been significant capability advances in cloud computing and software for managing data. The previous efforts created tools that were clunky and operated unacceptably slowly on the network. Tools today have slick user interfaces, and their capabilities continue to increase.

**ASA(ALT) lessons learned.** ASA(ALT) has a wealth of institutional knowledge on previous data transformation attempts. The current data team is reviewing the earlier efforts to learn what was effective and what was ineffective. As a result, ASA(ALT) is taking steps to mitigate the known risks and leverage the experience of those who worked on the previous data transformations.

### DEMOCRATIZATION OF DATA

Currently, the acquisition community collects and presents data for decision-makers only at key milestones. However, the development of an automated system will allow users at all levels to begin leveraging data throughout the acquisition enterprise to conduct

their jobs more effectively. This concept, known as democratization of data, is practiced in parts of industry.

There will be appropriate limitations on who can access and edit data, based on roles within the organization, but there won't be limits on access to the tools themselves. Once users see how these tools can help them complete their jobs, they will become more invested in maintaining and learning how to use them. With sufficient tools, the Army could optimize its investments and programs to maximize lethality over the next decade.

Companies like Amazon and Google maintain a sizable advantage over their competitors by collecting and leveraging data better than their peers. Everyone within a company has access to the data they need, when they need it—in other words, it's democratized. Industry has seen the benefits of data management, and continues to invest billions every year in information technology systems and analytical tools that identify opportunities to increase revenue and reduce risk.

Many of these organizations are migrating legacy systems to fast and efficient cloud-computing centers such as Microsoft Azure or Amazon Web Services. Once the data is centralized, companies are able to visualize it and apply analytical tools, allowing better, more efficient decisions. These companies have demonstrated that leveraging data is essential for competing and winning in today's marketplace; the same will be true on tomorrow's battlefields.

### CONCLUSION

It has become apparent that the acquisition community needs to invest in better tools and systems in order to effectively coordinate modernization of the Army. Now is the time for ASA(ALT) to radically change how the culture manages the data and decisions that allow the Army to optimize modernization.

For more information, contact the author at [mario.m.iglesias.mil@mail.mil](mailto:mario.m.iglesias.mil@mail.mil) or 703-697-4320.

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## MAKING CONNECTIONS

Army data is stored in hundreds of different places. The Army Leader Dashboard attempts to round it up so leaders can access and visualize all the information the Army has but can't use effectively. (Image by Photographer is my life./Getty Images)

# CREATING INSIGHT-DRIVEN DECISIONS

The Army Leader Dashboard is tackling the Army's data problem, bridging the gap between assumptions and insights for strategic resource decisions.

*by Ellen Summey*

**T**he Army has a data problem. To make informed decisions about resource allocation and readiness, senior leaders need access to reliable, trusted and timely data. While the Army has mountains of relevant data, it is not always readily accessible, verified or authoritative. Compounding the matter even further, data is frequently duplicated or of questionable quality.

To put the problem in perspective, Dr. Bruce D. Jette, Army acquisition executive, shared a tongue-in-cheek anecdote during a town hall meeting in November at Fort Belvoir, Virginia, about how he might determine the exact number of tanks the Army has.

"I call J.B., my XO [executive officer]," Jette said. "I ask him, 'J.B., how many tanks do we have?' He says, 'Sir, I'll find out and get right back to you.' Right back to me is a week." Jette illustrated the chain of events that might follow. His executive officer would ask someone, who would call someone else, before the task eventually fell to the person who would walk out into the rain to manually count tanks in a parking lot.

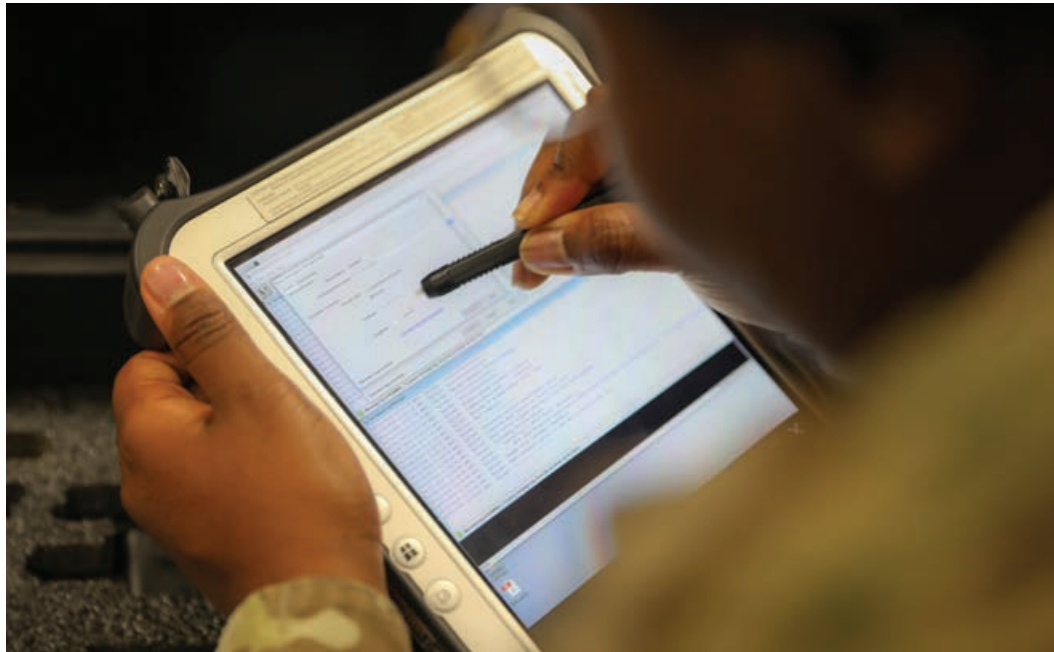
The anecdote illustrates a complex problem that leaders face every day: Army data is housed in hundreds, if not thousands, of disparate systems that typically don't communicate with one another. Sometimes the single, authoritative source for one type of data is a spreadsheet on a supply sergeant's desk. So how might senior leaders access that information when it is needed?



That was the question put to the Program Executive Office for Enterprise Information Systems (PEO EIS) by Gen. Mark A. Milley, Army chief of staff. Milley wanted a way to access and visualize those troves of Army data, to inform decision-making at the executive level. The challenge, then, was to identify the sources of relevant data, connect to them and provide the sort of display Milley was seeking. After researching commercially available solutions and related systems used by other services, Milley and PEO EIS set out to obtain a secure, web-based application that could be accessed from any approved device. (See Figure 1, Page 19.)

### TACKLING THE COMPLEXITY

This ambitious project, called Army Leader Dashboard, quickly morphed into more than just a simple display for Army data. As PEO EIS assembled a team and coordinated vendors and contracts, Milley provided feedback to shape early prototype development. Through this process, he and other senior leaders began to understand two important things: First, the data problem is even more complex than they initially assumed. Second, the dashboard tool could provide a tremendous amount of insight if applied more broadly across Army domains.



### ONE OF MANY DATA SOURCES

Pvt. Sherry Chapman, a logistician with Theater Movement Control-In-Transit Visibility, 21st Theater Sustainment Command (TSC), enters equipment information into the Single Mobility System on the Portable Deployment Kit tablet. (Photo by Staff Sgt. Adrian Patoka, 21st TSC)

“It was born as a readiness platform,” said Col. Kyle Jette (no relation to Dr. Bruce Jette), an Army G-8 (Programs) data analyst and the dashboard’s data expert. “It had a smaller scope than it does now but, as Gen. Milley saw the prototypes,

he was so impressed by the power and the potential, and he wanted all Army data brought in.”

With that directive, the team had a steep hill to climb. Early efforts identified more than 700 unique sources of data, all of which might potentially need to be linked to the dashboard. Those data sources run the gamut from training databases to equipment inventories, personnel records and maintenance reports.

**The Army Leader Dashboard was designed to address data problems within the Army’s business systems and enterprise mission areas—logistics, human resources, finance, and so on—but similar issues plague the weapons and intelligence systems as well.**

“There is a data capture team that interacts with the data sources, and they work to identify applicable data,” said Rajat Senjalia, technical director for the Strategic Initiatives Group at PEO EIS, which leads the dashboard project. “They utilize different technologies to bring that data in, whether that data is structured,

unstructured, semi-structured, what type of data source it's coming from and what type of connection is required to absorb that information." (See Figure 2, Page 20.)

Finding that data is just the first step. The dashboard team then makes contact with the data's owners to identify which pieces are relevant and needed for senior leaders. At first, the team set out to capture any and all data from those identified sources. Over time, it developed a more targeted approach, seeking only data that is original and authoritative from each source.

"What we're looking to do is methodically and deliberately go through one domain at a time," said Col. Jette. (A domain might be "people," "training," or "equipment.") "We're having the leaders from each domain identify the priority systems that are their 'center of mass.' There are, in some cases, scores of data systems within a particular domain, and we simply don't have time to cover all of them, so we're

asking the domains to identify the top 10 or so. We discuss those, how they relate to each other, how they provide original information to the Army."

That original information is key. For example, the Army Leader Dashboard will need to pull data from the Logistics Modernization Program (LMP), also at PEO EIS. LMP alone has some 40 terabytes of data—more than 17 billion single-spaced, typed pages. However, of those 40 terabytes, only a fraction is original and authoritative information, so the challenge is to identify which pieces to pull and which to disregard.

### WHICH DATA IS THE BEST?

The team focused on the concept of "cornerstone data"—that is, the Army's uniquely identifiable things. "We've identified the need for at least four categories: people, units, major equipment and places, at the site level," Col. Jette said. "I'm an individual; I can always be identified by

my Social Security number. A unit will have a unit identification code, a piece of major equipment will have a 16-digit item unique identifier [UID], and places will have a site UID or a particular building will have a real property UID."

The dashboard team then builds on that cornerstone data, linking the many thousands of secondary attributes associated with those uniquely identifiable things. If a commander wanted to locate all active-duty sergeants stationed at Fort Bliss, Texas, who have Chinese language proficiency and advanced cybersecurity certifications, the dashboard would enable that search.

Part of the challenge, though, is deciding which is the primary, trusted source for a given dataset. For instance, human resources data is sprinkled across nearly every system the Army operates. A Soldier's name, date of birth, Social Security number or other relevant details

## MORE THAN THE USUAL DASHBOARD

According to the Army Data Strategy, data should be visible, accessible, understandable, trusted and interoperable. Lt. Col. Rob Wolfe, Strategic Initiatives Group director at PEO EIS and the lead for the dashboard project, said the dashboard team has been driving the kinds of conversations that will help achieve that goal.

"What we're seeing is a change in the way the Army governs and manages data," Wolfe explained. "These problems are driving change—hopefully, enduring change—so that we can maintain consistent, quality data. Between the Office of Business Transformation, which is responsible for architecture, the Army Analytics Board, which is responsible for how we integrate and analyze data, and the Army Data Council, which is responsible for standards, we are seeing those bodies getting into the same room and having conversations that the Army hasn't had before.

"It's more than just a dashboard," Wolfe continued.

"It's the first thing we've seen that allows leaders at all echelons of command to look across domains. There are a lot of systems that allow you to look at people, to look at equipment, to look at training, but there are not any systems that allow you to look across all those areas and see how resourcing decisions in training affect people, or vice versa. We're really trying to give leaders a tool to make strategic resource decisions and understand the impacts across the Army." His goal is to enable "insight-driven" decisions.

For the dashboard team, readiness is the bottom line. "What previously could take multiple weeks is now being done in real time," said Rajat Senjalia, technical director for the Strategic Initiatives Group. "When senior leaders can utilize one tool that can aggregate the necessary information, it enables you to make an executive-level decision on anything from troop movement to resource allocation. That is invaluable to the Army."





## DATA INCOMING

A Soldier with the 2nd Cavalry Regiment receives GPS data during Dynamic Front 2019 training in Grafenwoehr Training Area, Germany, March 6. Data such as the deflection, quadrant, round type and fuze setting is vital to the success of a fire mission. (U.S. Army photo by Sgt. LaShic Patterson, 2nd Cavalry Regiment)



## WHAT IT'S ALL ABOUT

Lt. Col. Rob Wolfe, project lead for the Army Leader Dashboard, explains the project at a January meeting attended by Dr. Bruce D. Jette, the Army acquisition executive and assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)), and Principal Military Deputy to the ASA(ALT) Lt. Gen. Paul A. Ostrowski. (Photo courtesy of the author)

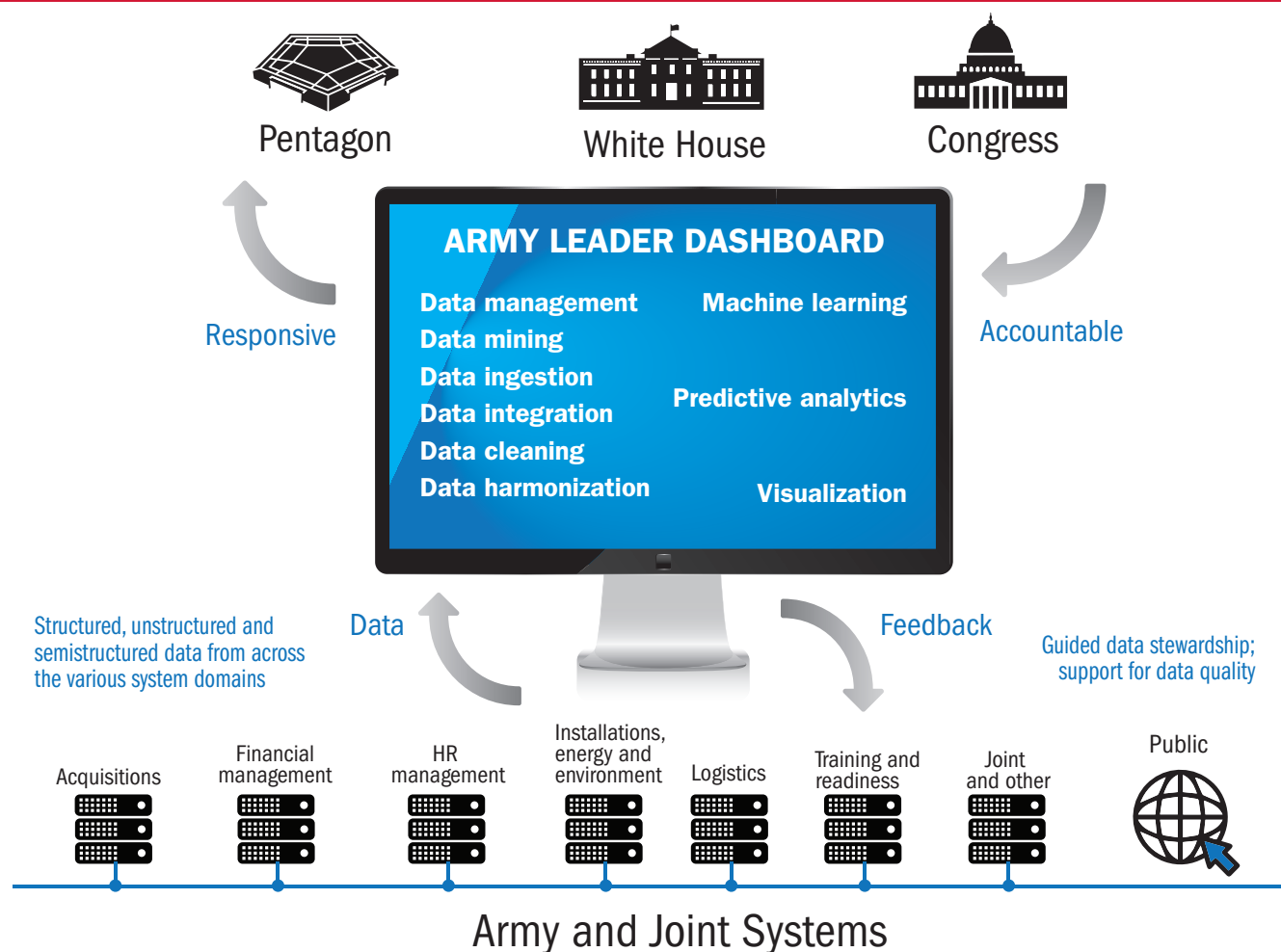
are repeated over and over again across domains and systems. Whether the Soldier manually re-enters that information (for a medical appointment, perhaps), or it is copied directly from another source, it is duplicated many times over, but only one source for it should be linked to the dashboard.

“When I come into the Army, my basic information should go in once and only need re-entry upon change,” said Chérie A. Smith, program executive officer for EIS. “Some things may change. I might get married, I might have a couple of kids, but my basic information will remain the same. However, because we have all these systems that have grown up on their own, we’re re-entering that information a million times. And why do we do that? The reason is, when you’re looking at it from one system view, it’s always cheaper to do the manual re-entry than to build the interface [to an existing system].”

In truth, no one would have designed the Army’s data systems to look the way they do today. It’s not by design, but by a lack of design, that Army data exists in silos and can be difficult to access. Imagine how a city might look if it grew with no urban planning, zoning or infrastructure oversight. Anyone who needed a house or an office would be free to build one, but there might be no power grid and no city water supply. It would be a bit like the Wild West. That’s essentially how the Army’s data systems developed.

“You look at these planned communities where everything is pretty and operational, but they knew what the result was before they started,” said Lt. Col. Rob Wolfe, Strategic Initiatives Group director and the lead for the dashboard project. The Army “didn’t do that. We have 50-year-old systems in one place, and we have 1-year-old systems in another place.”

FIGURE 1



#### AND SO IT GROWS

The initial idea for the dashboard was a secure app that Army leaders could check from any approved device to access data across different functions. Because of its potential utility, the concept grew into the Army Leader Dashboard initiative. (Graphic by U.S. Army Acquisition Support Center (USAASC); SOURCE: PEO EIS)

#### GETTING HERE

The Army Leader Dashboard initiative is still quite young, having been established in July 2017. PEO EIS released the solicitation on May 10, 2018, and awarded five contracts for prototypes in mid-August. Those five initial prototypes were narrowed to two by the end of 2018, with the final vendor selection expected by August 2019.

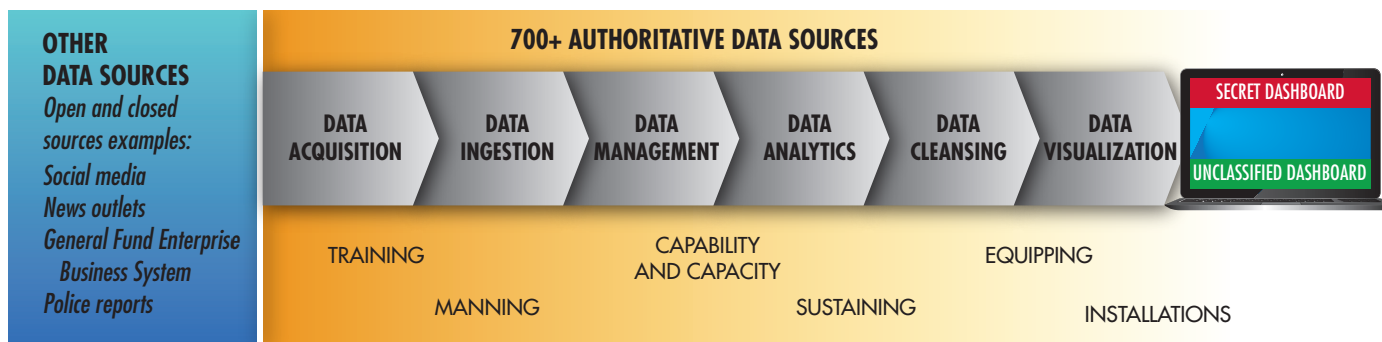
“The two prototypes we currently have are actually on Gen. Milley’s desktop and Dr. Jette’s desktop, and have been for a

number of weeks,” Col. Jette said. Milley and Dr. Jette provide specific feedback about how the prototypes are performing and how well they demonstrate the correlations between data.

That feedback and rapid prototyping were made possible by an other transaction authority agreement, which provides a shortcut compared with the traditional acquisition process for certain programs. Such contracts can be especially important for technology and software projects, in which solutions quickly become outdated or obsolete.



FIGURE 2



### THE MISSION AND VISION

The project team identified more than 700 sources of data as it began work on the data dashboard. (Graphic by USAASC; SOURCE: PEO EIS)

“The use of [other transaction authority] has been huge for us,” Smith said. “It has enabled us to do things that wouldn’t have been possible before, in terms of rapidly prototyping and producing new products. [It] isn’t right for every kind of project, but it’s great for software.”

### CONCLUSION

The dashboard team remains focused on compiling, testing and understanding the Army’s data, but Wolfe is also looking at the road ahead. He believes the Army Leader Dashboard solution could eventually serve as a “common data platform” for the entire Army. “There are hundreds of dashboards in the Army,” Wolfe said. “Every command is pulling from similar datasets, but data has a ‘date/time’ stamp for truth. If we get to the point where we’ve successfully gotten all this data together and curated it so it’s trustworthy and reliable and timely, then anybody else who has a dashboard can leverage [the Army Leader Dashboard] as their source of data. Then our leaders can talk apples to apples. We have to have one version of the truth for data.”

The Army Leader Dashboard was designed to address data problems within the Army’s business systems and enterprise mission areas—logistics, human resources, finance, and so on—but similar issues plague the weapons and intelligence systems as well. Wolfe believes the dashboard process could be applied there with comparable results.

“I think some of the processes and models we’ve built to get after data quality could be applied to the other mission areas,” he said. “There are a lot of lessons learned that could be applied to keep the other mission areas from making the same mistakes, to expedite their path toward data quality. In my years in the Army, I don’t know that I’ve ever come across a problem that somebody hasn’t faced before. We try to leverage what other folks are doing: Take the best of what everybody’s doing, to make a comprehensive, executable approach.”

Ultimately, Smith believes the Army Leader Dashboard is changing the way the Army approaches its data. If data is inaccessible, unusable or unreliable, it is essentially useless. “We have been focused

**The dashboard tool could provide a tremendous amount of insight if applied more broadly across Army domains.**

for 20 or 30 years on transactions, and I think we’re going to start really, truly making that leap to focusing on the data and the information.”

*For more information on the Strategic Initiatives Group or the Army Leader Dashboard initiative, contact the PEO EIS Strategic Communication Directorate at [usarmy.peoeis@mail.mil](mailto:usarmy.peoeis@mail.mil).*

*ELLEN SUMMEY provides contract support to PEO EIS at Fort Belvoir for Bixal Solutions Inc. She holds an M.A. in human relations from the University of Oklahoma and a B.A. in mass communication from Louisiana State University. She has more than a decade of communication experience in both the government and commercial sectors.*



**CONNECTING THE ARMY.  
WORKING FOR SOLDIERS.**





# At Work

## Profile: PROGRAM EXECUTIVE OFFICE FOR Enterprise Information Systems

The second in a series, ASA(ALT) at Work, which looks into ASA(ALT) organizations, what they do and where they do it.

Led by Chérie A. Smith and headquartered at Fort Belvoir, Virginia, PEO EIS is the Army's home for information technology (IT) networks and business systems. Leading more than 3,000 personnel, Smith manages approximately \$3.5 billion per year in support of all 10 combatant commands, and also aids foreign military sales. The PEO comprises 37 product offices and 71 acquisition programs for Army and DOD communications, logistics, medical, finance, personnel, training and procurement operations. In short, PEO EIS connects the Army, supporting Soldiers worldwide.



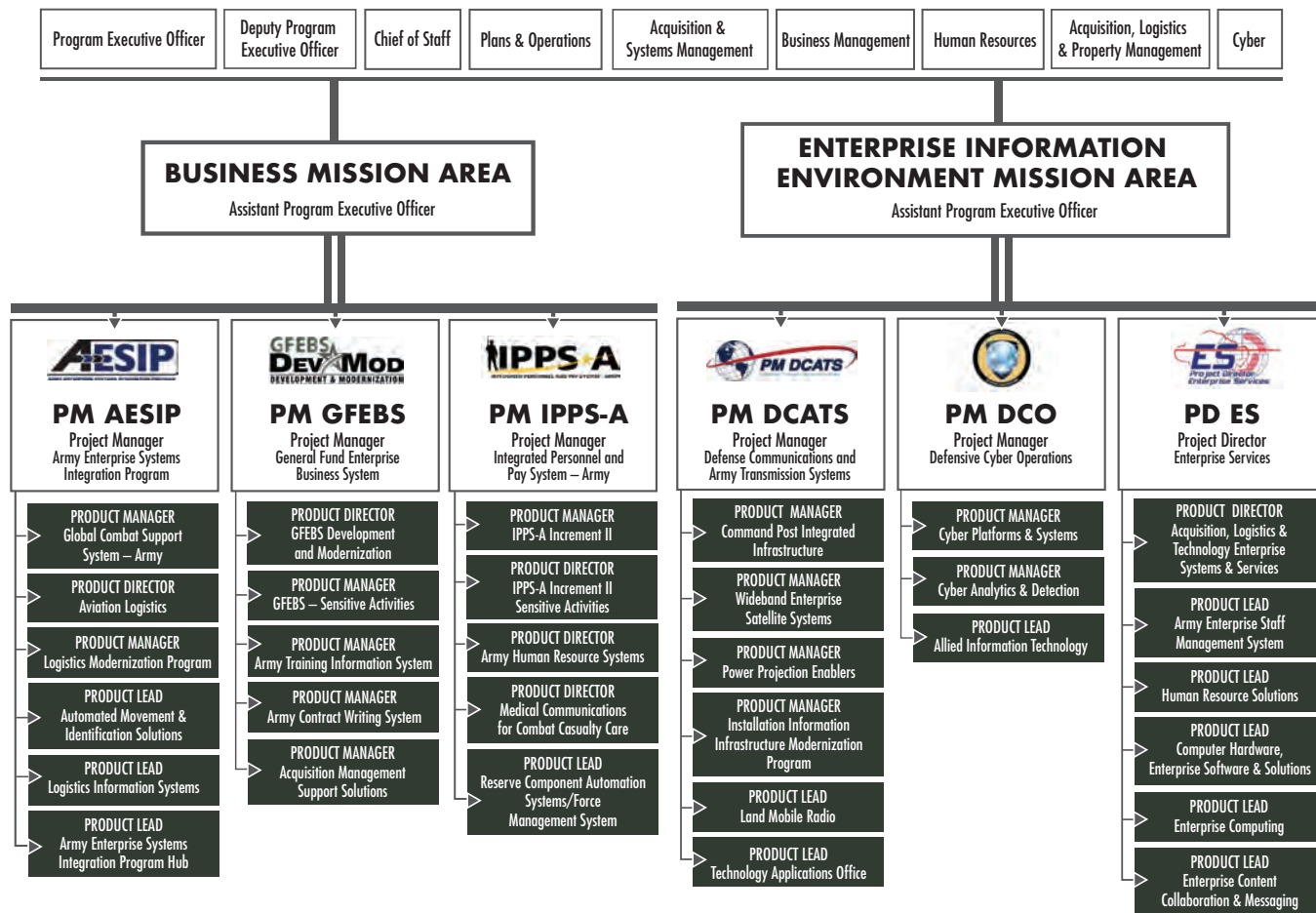
### WHAT SHOULD WE KNOW ABOUT PEO EIS?

From recruitment to retirement, home station to foxhole, our systems support Soldiers every day around the world, making sure they're ready to fight tonight.

- We are the Army's trusted network and software acquisition professionals.
- We believe that the Soldier is the centerpiece of everything we do.
- We support the total Army and serve as a committed teammate.
- We ensure that the Army's networks, logistics, human resources, finance, business systems and cyber defense support anything a Soldier and the Army need to do the job, every day.
- We get Soldiers to the fight, support the fight and bring them home safely.

### ◀ TAKING STOCK

Soldiers work with the Automated Movement and Identification Solutions (AMIS) system developed by PEO EIS. AMIS combines the capabilities of the Radio Frequency In-Transit Visibility system and the Transportation Coordinators – Automated Information for Movements System II to automate planning, coordination, execution and tracking of unit deployment, movement and sustainment, assisting DOD in improving asset visibility worldwide. (Photo courtesy of PEO EIS)







**SOLDIER TOUCH POINTS** ▲ Brig. Gen. Yesenia R. Roque, assistant director for Army National Guard Personnel and Talent Management, discusses IPPS-A with Virginia National Guard Soldiers during an April 6 visit to the 116th Infantry Brigade Combat Team in Staunton, Virginia. Virginia is the second state to conduct initial fielding of IPPS-A, developed by PEO EIS and designed to integrate personnel, pay and talent management capabilities in a single system for all Army components. (U.S. Army National Guard photo by Sgt. Saul Rosa)

## BIGGEST DATA CHALLENGE FOR PEO EIS? ►

*Complexity.*

*Smith: "Our challenge is about communicating the complexity of the Army's data landscape. The fact that it's being discussed by our senior leaders is something I'm really proud to see. When it comes to the Army's data, there is no panacea. There's no quick fix. You've got to do the hard work, and we're ready to take that on."*

## ◀ BIGGEST SUCCESS?

*Fostering partnerships with Army stakeholders.*

*Smith: "The partnerships we've forged with our key Army stakeholders. They are investing in the way forward and helping us lay out that future. Having those advocates that understand the value we provide and are willing to speak on our behalf is critical for us to be successful."*



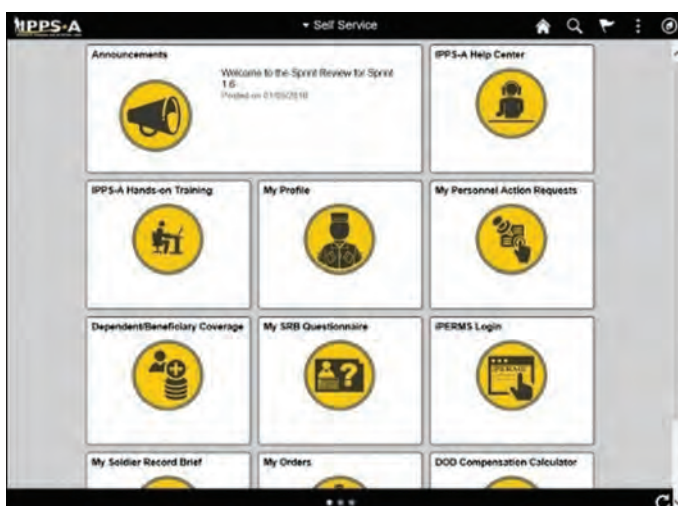
## ▲ CYBERSECURITY TO GO

PEO EIS acquired for assessment this prototype defensive cyber system small enough to fit in an airplane's overhead storage compartment, enabling faster deployment and greater operational flexibility. (Photo by Cecilia Tueros, PEO EIS)



## ◀ POP-UP SHOP

Fielded in conjunction with the U.S. Army Communications-Electronics Command, the Inflatable Satellite Antenna is easier to move and set up, and operates on commercial and military frequency bands, reducing signal-jamming threats. (Photo courtesy of PEO EIS)



## ◀ WHAT WOULD BE A SUCCESS STORY FOR PEO EIS, IN TERMS OF DATA?

*The end user.*

*Smith: "To me, the success is all about the end user, the operator: if we can get them the data they need, in the time they need it, to allow them to make the right decisions, whatever that may be—medical, operational, maintenance."*

## POSSIBILITIES AT YOUR FINGERTIPS ▲

IPPS-A's mobile capabilities provide all Soldiers access to their Army personnel record without requiring a common access card for authentication. Soldiers can submit help inquiries, request updates to their record, and monitor the status of their personnel actions from a mobile phone or tablet. (Photo courtesy of PEO EIS)

## WHAT ARE YOUR RECENT WINS?

**Smith:**

We are rolling out the Integrated Personnel and Pay System – Army (IPPS-A), the Army's new comprehensive human resources system that has subsumed the Standard Installation and Division Personnel Reporting System.

The Project Manager for Defensive Cyber Operations opened "the Forge," a facility designed to foster collaboration among Army IT, academia and industry partners that allows cyber troops to test emerging technologies to address cyber threats. "When I saw the world-class development of the Forge, three words came to mind: speed, agility and invention," said Lt. Gen. Stephen G. Fogarty, commanding general of U.S. Army Cyber Command.

Our Allied Information Technology program celebrated a major milestone on March 12. Armed Forces Ukraine, along with Allied Information Technology, hosted the U.S. ambassador to Ukraine, Marie Yovanovitch; Ukraine's deputy minister of defense, Oleg Shevchuk; and the chief of defense forces, Viktor Muzhenko, at a ceremony commemorating the transition of responsibility for various mission command, cybersecurity and defense business system capabilities valued at nearly \$25 million. These assets have been implemented by Army IT in

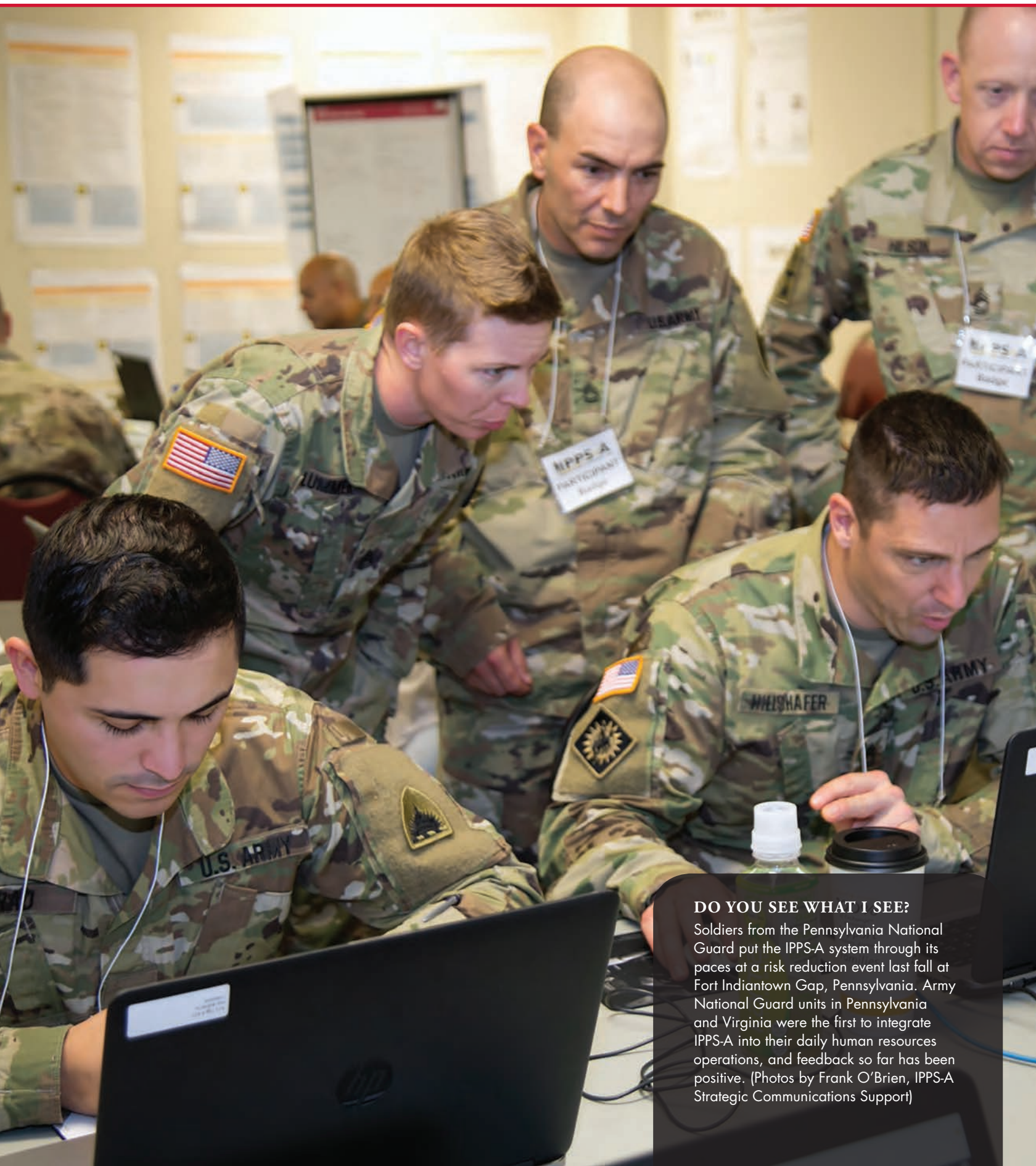
Ukraine, under the Ukraine Security Assistance Initiative over the past three years.

In only eight months, the Project Manager for Defensive Cyber Operations has developed and fielded a prototype deployable defensive cyber system that can be easily transported in the overhead storage compartment of a commercial airline. This is a vast improvement over the larger systems used previously, and enables much faster deployment with better flexibility and capability.

In conjunction with the U.S. Army Communications-Electronics Command, PEO EIS is fielding the Inflatable Satellite Antenna on the Korean peninsula. The antenna is a versatile, lightweight improvement to an existing mobile satellite dish (the Combat Service Support Very Small Aperture Terminal), and is easier to move, faster to set up and provides more flexibility to operators. (For more information, see the Faces of the Force profile of Capt. Zachary Schofield, Page 114.)

We are addressing the Army's data problem through our Army Leader Dashboard initiative, providing a way for senior leaders to access and visualize the Army's troves of data. (For more information, see "Creating Insight-Driven Decisions," Page 14.)





#### DO YOU SEE WHAT I SEE?

Soldiers from the Pennsylvania National Guard put the IPPS-A system through its paces at a risk reduction event last fall at Fort Indiantown Gap, Pennsylvania. Army National Guard units in Pennsylvania and Virginia were the first to integrate IPPS-A into their daily human resources operations, and feedback so far has been positive. (Photos by Frank O'Brien, IPPS-A Strategic Communications Support)



# IPPS-A FACTO

How the Army fielded its next-generation human resources system to the Pennsylvania Army National Guard.

*by Col. Greg Johnson*

“No plan survives contact with the enemy.” This piece of battlefield wisdom has been passed down over the years after being introduced in 1880 by Prussian military strategist Helmuth von Moltke. I witnessed the truth of this axiom on several occasions while deployed to Iraq and Afghanistan, and also as the functional lead overseeing the development of the Army’s next-generation human resources and talent management system. Not only did I observe how the best-laid plans were disrupted by changing realities, but I also experienced firsthand the power of aggressive, agile teams to overcome our challenges and deliver capabilities that will revolutionize the human resources business throughout the Army.

## FORGING THE FUTURE

The Integrated Personnel and Pay System – Army (IPPS-A) integrates all 1 million Soldiers into a single system for the first time. IPPS-A provides increased visibility, talent management capabilities and auditability to all three Army components (active duty, Reserve and National Guard). The system delivers enhanced transparency and access to Soldier records and personnel actions like never before. It provides timesaving, self-service tools to total force Soldiers, commanders and human resources professionals, and enables mobile capabilities.

IPPS-A grew out of earlier DOD attempts to modernize the military’s human resources enterprise. The Army, realizing its unique personnel and talent management requirements, set out to standardize and reduce more than 200 human resources and pay systems that were being used across the Army National Guard, Reserve and active components to process routine transactions. As mandated by the Army’s Total Force Policy, IPPS-A standardizes business practices, provides authoritative data for military personnel, and facilitates a continuum of services across all three components.

Since its inception, IPPS-A has made significant progress toward building a system that will usher in a new era of human resources and talent management in the Army. Stakeholder



engagement is critical to this effort. In the last two years alone, we have executed more than 400 engagements with stakeholders throughout the total force Army, as well as with key influencers throughout DOD and Congress. These engagements included technical reviews of the system, software demonstrations, deployment briefs, functionality working groups and other events. We captured and applied feedback from stakeholders who will use IPPS-A as part of their day-to-day activities, leveraging the unique insights of total force Soldiers and Army civilians at all levels.

### THE DRIVE TO BUILD RELEASE 2

IPPS-A is currently on course to be deployed throughout the Army National Guard. In January 2019, the Army fielded IPPS-A to the Pennsylvania National Guard and conducted a limited user test of the system. Pennsylvania National Guard Soldiers integrated IPPS-A into their daily human resources operations and put the

system through its paces. The test was successful. Now, we are preparing the next states—including Virginia, Maryland and the District of Columbia—to receive the system. We expect full deployment of IPPS-A throughout the Army National Guard by early 2020.

At every step of this process, we partnered with the Army National Guard to help it become the first component to field the system. We cultivated relationships with each of the 54 state and territory Army National Guard entities as well as National Guard Bureau stakeholders to hear their feedback and inform the build process for Release 2 of IPPS-A. Starting in August 2018, we worked alongside our Pennsylvania National Guard counterparts to execute three critical events that ultimately would pave the way for IPPS-A's fielding in the commonwealth.

Throughout these events—the risk reduction event, the system-acceptance test and the limited user test—we leveraged

the Pennsylvania Army National Guard's extensive expertise to improve the system and meet the needs of the customer. The Pennsylvania Army National Guard influenced the functionality of the system—everything from how a Soldier submits a personnel action request to human resources analytics, like the human resources authorization report used by commanders. We also worked closely with the National Guard to ensure that the interfaces with existing authoritative data sources, like the Army Organizational Server – Data Interface and the Reserve Component Manpower System – Guard, accurately and correctly fed data into IPPS-A. Data correctness is an incremental step toward larger efforts of talent management and total force visibility. It affects how decisions are made, and the consequences of those decisions have a downstream effect on the Soldiers we support. Pay will be linked to human resources transactions in IPPS-A, so data must be correct.



### PUTTING THE SYSTEM THROUGH ITS PACES

Full deployment of IPPS-A throughout the Army National Guard is expected by early 2020. Developers conducted more than 400 engagements with stakeholders throughout the Army, including this system acceptance test in Pennsylvania last fall, capturing and applying feedback from Soldiers who will use IPPS-A as part of their day-to-day activities.

### ADAPTING TO THE ENEMY

By summer 2018, IPPS-A was on track for deployment to the Pennsylvania Army National Guard by the end of the year. This effort began with the risk reduction event to test end-to-end business processes of IPPS-A and ensure that the system could subsume the functionality of the Standard Installation and Division Personnel Reporting System, the primary human resources database used by the Army National Guard. The event enabled us to ensure that the outputs were accurate and consistent with National Guard requirements, and provided a precheck to normal testing procedures. The risk reduction event was followed by the systems acceptance test, a critical milestone that would provide a more comprehensive test of the system's ability to accomplish business processes.

As we proceeded through the development process, we learned how to optimize communication between IPPS-A's internal teams (including developers) and external stakeholders and to work together as one cross-functional, agile team. I believe this was the secret to our success. Our team realized that by nesting with our Army

***IPPS-A standardizes business practices, provides authoritative data for military personnel, and facilitates a continuum of services across all three components.***



### MODERNIZED, STREAMLINED, READY

By streamlining processes across Reserve, National Guard and active-duty components, IPPS-A enables the Army to optimize Soldiers' capabilities and maximize contributions to Army readiness.

National Guard counterparts and the system integrator developers, we could shorten the decision cycle to improve the system and perform critical fixes to make it work more efficiently. This enhanced our collective ability to address key data and coding issues, with strong results that would ensure that IPPS-A would be delivered on time and built right to meet the needs of the Army National Guard.

By the time we reached the systems acceptance test, we had established four collaborative teams tasked with streamlining approval to field and creating a more agile environment that would address issues in real time. Each team played a critical role in getting us through the system-acceptance test (SAT). Their functions were as follows:

- **The SAT Lab:** This team enabled participants to work through structured user scenarios. Through the SAT Lab, the IPPS-A team received direct feedback from participants on what was working, what wasn't, and what needed to be fixed. Participants looked at IPPS-A from an end-to-end perspective and asked a critical question: "Can the system pass these scenarios?"
- **The Dual Entry Cell:** The Pennsylvania National Guard led this important team tasked with reworking the activities conducted during the risk reduction event. The Dual Entry Cell facilitated more robust testing of IPPS-A's business processes to identify key issues.
- **The Policy, Processes and Procedures (P3) Cell:** Led by the National Guard Bureau, participants of the P3



Cell looked at what came out of the SAT Lab and the Dual Entry Cell and asked, “What National Guard policy or procedure do we have to change based on this new system?” For any defect that came in, members of the P3 Cell worked side by side with IPPS-A program personnel to determine why it was a defect and strategize how it could be fixed.

- **The Tactical Operations Center:**

This team managed all of the activities from the SAT Lab, the Dual Entry Cell and the P3 Cell, and facilitated coordination among units.

As a result of our agile structure, these four cells enabled us to swiftly address issues and strategize solutions with the help of our Army National Guard counterparts. We brought in developers to work hand in hand with data owners and end users to fix defects and improve the system. This was a first: Never in the history of the Army had we deployed new equipment while simultaneously improving it based on stakeholder feedback.

## CONCLUSION

The Pennsylvania and Virginia Army National Guards are the first states to integrate IPPS-A into their daily human resources operations, and we’ve received feedback that the system is making a difference. IPPS-A provides increased transparency and accessibility, enabling Soldiers to operate on-the-move and accomplish routine tasks that previously required an in-person trip to a G-1 or S-1 shop. Soldiers can now request updates to their records, monitor the status of their personnel actions and submit help inquiries from the palm of their hand. Self-service transactions are automated,

paper-free and trackable from initiation to approval.

In addition, because of IPPS-A’s mobile capabilities, commanders and human resources professionals can review and

***As we proceeded through the development process, we learned how to optimize communication between IPPS-A’s internal teams (including developers) and external stakeholders and to work together as one cross-functional, agile team.***

approve transactions without being tied down to their desk or workstation. Commanders can now view analytics of their formation and view their Soldiers’ skills directly in the system, a level of access not present in the legacy environment. “With IPPS-A, I can track which Soldiers have which certifications,” said Capt. Isaac Rivera of the Virginia Army National Guard. “As the commander of a maintenance company, that makes me very excited.”

IPPS-A is transforming the Army’s human resources business, which will pay huge dividends for the total force in the years to come. By introducing modern, redesigned functionality and offering real-time availability and self-service capabilities, IPPS-A improves transparency for all Soldiers. The

system streamlines processes across all three components into one way of doing business, and enables the Army to optimize Soldiers’ capabilities and maximize contributions to Army readiness, task organization and mission accomplishment.

As one of the senior-most leaders of the Pennsylvania Army National Guard, Col. Laura McHugh, said during the limited user test, “IPPS-A has set the standard for how the Army should implement an Army system.”

Learning from Moltke, we made disciplined and prioritized choices during development that led to IPPS-A’s successful deployment to the Pennsylvania Army National Guard and enabled us to move forward in our journey to modernize human resources and talent management across the total force. We adapted to enemy contact and counteracted that by massing the right talent in Fort Indiantown Gap, Pennsylvania, for the risk reduction event, the system-acceptance test and the limited user test. By restructuring our teams and increasing communication with both internal and external stakeholders, we remain on track to bring IPPS-A to the rest of the Army National Guard and beyond.

*For more information, go to [www.ipps-a.army.mil](http://www.ipps-a.army.mil).*

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# SUSTAINING DATA DELIVERY ON THE FUTURE ARMY NETWORK

To build a network that will last, the Army is planning how to maintain and repair its many components while they're still being developed.

*by Maj. Gen. Randy S. Taylor*

## PERFORMING AS PROMISED

A Tobyhanna Army Depot electronics mechanic adjusts an AN/TPQ-36 Firefinder radar system. Tobyhanna raised its "performance to promise" metric, a broad measure of the depot's overall performance, to 93 percent in FY19, from 49 percent four years ago. (U.S. Army photo by James Lentz)



In September 2017, the U.S. Army made a startling, but necessary, announcement: It would halt development of the Warfighter Information Network – Tactical (WIN-T), its ambitious network modernization initiative begun in 2007. The voice, video and data transmission system had become too fragile, vulnerable and complex to effectively connect and protect Soldiers in a near-peer adversary fight on the 21st-century battlefield.

The Army needed to change course—fast.

The next month, it announced the creation of the U.S. Army Futures Command and designated the network one of its six modernization priorities. And, in 2018, it stood up the Network Cross-Functional Team, bringing experts across the requirements, development and acquisition communities together to drive what the network would be in the future.

Today the Army is working toward a reliable, resilient and adaptable network that can operate in contested electromagnetic spectrum and cyber environments. The network encompasses two domains: an Integrated Tactical Network focused on battlefield communication and the conduct of war, and an Integrated Enterprise Network focused on hybrid cloud, business and physical infrastructure services and applications.

The Army envisions that, by 2028, the network will be fully unified, sharing common applications, services infrastructure and transport layers. This will help break down data silos and stovepipes, enable interoperability and deliver data at the speed

of maneuver to the precise point of need. One of the network's key requirements is that it can be used as a weapon—and data truly is its ammunition.

### CECOM: THE FOUNDATION OF NETWORK SUSTAINMENT

The U.S. Army Communications-Electronics Command (CECOM), a life cycle management command of the U.S. Army Materiel Command, plays a critical role in the success of the Army's current and future network. CECOM sustains the Army's vast portfolio of command, control, communications, computers, cyber, intelligence, surveillance and reconnaissance (C5ISR) systems. These hardware and software systems form the backbone of the tactical network, the part of the future network that CECOM is currently responsible to sustain.

To execute that mission, CECOM is heightening its focus on cross-life-cycle engagement, which remains a core fundamental of sustainment even with the introduction of new technologies on the tactical network. The Army has long understood that 55 to 70 percent of a program's life cycle cost is in the sustainment tail. Given that large cost, effective planning for sustainment must begin when system requirements are being defined. That takes active planning and cooperation with organizations across the Army enterprise.

CECOM works closely with Army Futures Command's Network Cross-Functional Team; the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology; the U.S. Army Training and Doctrine Command; the Army chief



### SUSTAINMENT CENTRAL

Tobyhanna Army Depot is the Army's organic industrial C5ISR sustainment center. It repairs, resets, overhauls, fabricates, engineers, upgrades and provides worldwide support for the entire fleet of C5ISR systems. (U.S. Army photo by Thomas Robbins)

information officer/G-6; and others to define sustainment requirements early in the technology life cycle. We also help program executive offices include sustainment language in contracts and create life cycle sustainment plans for fielded systems.

However, the introduction of the tactical network and the return of great power competition bring significant new demands for speed and rigor. In addition to heightening our focus on life cycle engagement with program executive offices and other Army technology organizations, we are challenging the status quo to redesign network sustainment from the ground up.

### THE OLD WAY

For much of the last 18 years of combat, the Army operated under the force generation model, which offered generous 180-day periods for whole-unit reconstitution and equipment reset. Under this system, it could take up to six months for CECOM to overhaul and return network equipment, using 26 different sources of repair.

This met the Army's need for C5ISR sustainment during asymmetric combat operations in Iraq and Afghanistan. But it led to increased costs, long repair turnaround times when units would be without needed equipment, and a general decrease in readiness to fight a near-peer adversary. In a multidomain, unpredictable conflict against a well-equipped enemy, this approach would put Soldiers' ability to fight and win—and their very lives—in serious jeopardy.

So we've taken a hard look at ourselves to drive reform and introduce new capabilities in several key areas—our “new way” of doing business. This new approach to sustainment is nested with the Army's effort to accelerate technology insertion

and close critical gaps by fielding new capability sets on a two-year basis. These technology sets build on one another, are infused with commercial solutions, and are informed by Soldier-led experimentation. This provides flexibility to augment and integrate information technology capabilities as they emerge from industry. Sustainment efforts are adapting to support this approach.

### INCREASING SUPPLY AVAILABILITY

CECOM's No. 1 priority is supply availability—getting the right part to the right place at the right time—and we are making steady progress toward our 100 percent goal. For example, in FY17, supply availability was at 77 percent, but by the end of FY19, it will be 93 percent.

A key part of our supply availability strategy is pricing contracts in advance, based on forecast needs, and moving to longer-term, 10-year contracts for key parts—we will have six such contracts by the end of this fiscal year. These contracts procure from multiple supply sources, and include language for surge production and expedited delivery in case contingencies arise.

Back orders are a sister metric to supply availability and a key indicator of the health of CECOM supply operations. Thanks to similar disciplined reform, we have brought back orders down from more than 8,000 in FY17 to slightly under 3,900 this fiscal year.

### IMPLEMENTING REPAIR CYCLE FLOATS

Today, the Army has transitioned away from the force generation model to the sustainable readiness model, which is designed around 90-day prepare modules. Given this change, CECOM is aggressively pursuing repair-cycle floats to get



### THE NETWORK AT WORK

A Soldier uses a network device on the Integrated Tactical Network during a live-fire exercise in Germany. The Army's tactical network encompasses a huge number of devices, products and technologies, all of which require regular maintenance and repair. (U.S. Army photo by Spc. Joshua Cofield, U.S. Army Europe)

equipment back to units as quickly as possible.

The idea is simple: Maintain pools, or “floats,” of ready-to-issue replacement systems to reduce turnaround times to practically nothing. In FY18, CECOM created the Army's first-ever float pool with 36 Satellite Transportable Terminals, Forces Command's highest-priority C5ISR system. That same year, we built floats across six systems totaling 215 units, and in FY19, that has risen to 13 systems totaling 319 units.

### REDUCING REPAIR CYCLE TIMES

CECOM is laser-focused on reducing repair cycle times to get network equipment back in the field faster. For example,



in the fourth quarter of FY17, it took an average 162 days to repair a Satellite Transportable Terminal at Tobyhanna Army Depot, CECOM's organic industrial facility in Tobyhanna, Pennsylvania. By the second quarter of FY19, that was down to 40 days.

Tobyhanna Army Depot has driven this improvement with workflow reforms and data-driven decision-making. In fact, its Performance to Promise, a broad, cross-metric measure of depot performance, rose from 49 percent in FY15 to 93 percent in FY19. This also enabled the depot to increase its capacity for major system repairs, which rose from 184 in FY17 to 300 in FY19.

## BRINGING DEPOT MAINTENANCE FORWARD

Another pillar of the CECOM sustainment strategy is to move depot-level maintenance and repair capabilities closer to where units are stationed. So in FY18, CECOM stood up Tobyhanna depot forward locations in Korea and Europe. Meanwhile, three depot forward locations in the continental U.S. are coming online this fiscal year.

By providing more immediate access to repair expertise and services, these facilities can help extend C5ISR system life by an average of five to seven years.

## CLOSER TO THE USER

Tobyhanna Army Depot's forward repair facility at Joint Base Lewis-McChord, Washington, brings depot-level repair and overhaul capabilities closer to Army units. Plans call for three forward repair depots to open in the United States this fiscal year. (U.S. Army photo)

## SUPPORTING SOFTWARE

Of course, tactical network hardware cannot operate without underlying software, sustainment of which is a core part of CECOM's mission. Accordingly, CECOM's Software Engineering Center has heightened its focus on electronic patching, or e-patching, mission command systems that have moved into sustainment. E-patching plugs vulnerabilities in a fast and secure environment, as opposed to manual delivery and installation via CD. This supports the tactical network objectives of increasing network resiliency and reliability by 2028.

Depending on bandwidth requirements and network availability, e-patching is not always viable for certain systems or for units deep in the field. But as much as possible, CECOM is increasingly making it the norm. From e-patching just eight of the 33 systems that were capable of being e-patched in FY17, we anticipate e-patching 24 systems by FY20.

## TRANSFORMING CONTRACTING

Transforming contracting is a cornerstone of CECOM's reform platform. Specifically, CECOM has focused on consolidating software contracts for common functions to find efficiency and save money. We are consolidating 43 such contracts to 34 by the end of this fiscal year.

We are also bringing together sustainment support for enterprise resource planning programs—business management platforms that track and manage financial, inventory and manufacturing data—under a unified contract to be awarded in December 2019. And we are bridging hardware and software sustainment under a major unified field support contract to be awarded by the fourth quarter of FY20.

## TAKING OUT 'INSURANCE'

A brand new concept, data escrow, is another exciting contracting initiative. Under certain circumstances, CECOM may need to secure technical data and intellectual property from manufacturers. However, this could be enormously expensive.

To address the expense, CECOM is experimenting with technical data escrow accounts, set up at the time contracts are signed. These storage accounts give third parties oversight and control of data in a virtual lockbox. They act as insurance policies in case of company bankruptcy, system failure, individual hardware parts becoming unavailable, or other unexpected events. In such cases, CECOM could negotiate to access technical data at a far lower price than it would cost to buy it outright. We have implemented an escrow account in one software contract



thus far, and we are laying the groundwork to establish this as common practice.

### SUSTAINING COMMERCIAL TECHNOLOGY – 5, 3, 1

For the acquisition and technology community, perhaps the most important network sustainment numbers to remember are five, three and one.

Faced with a mandate to modernize, program executive offices often turn to commercial C5ISR technologies and nonstandard equipment to replace legacy program-of-record systems. The manufacturers warranty these systems, but there is huge variation in warranty durations, conditions and pathways for Soldiers to secure repairs or replacements. To address this challenge, CECOM is borrowing a model the U.S. Army Special Operations Forces Support Activity uses to rapidly exchange non-mission-capable systems that are under warranty.

Five refers to the five-year warranty the Army will pursue for all new commercial off-the-shelf products and nonstandard equipment. Three refers to the Year 3 decision point, when the Army will decide if it will sustain the equipment's use after the initial warranty period. If yes, it will decide what entity will be responsible for sustainment—in most cases, CECOM, and in others, program executive offices—and establish a lasting supply chain. If no, it will divest the system.

One refers to the central warranty exchange: Tobyhanna Army Depot and its more than 40 forward locations around the world. In the future, Soldiers will be able to hand off any C5ISR commercial off-the-shelf product or nonstandard equipment that's still under warranty to any Tobyhanna representative, who will send it through the warranty exchange process. The five, three, one concept is still



### REPLACEMENTS AT THE READY

A Soldier operates a Satellite Transportable Terminal at Camp Roberts, California. CECOM created the Army's first-ever repair cycle float pool of 36 terminals to make repair turnaround on systems like these nearly immediate. (U.S. Army photo by Maj. W. Chris Clyne, 41st Infantry Brigade Combat Team)

in the planning stages, but we are excited about its potential.

### CONCLUSION

This web of connected strategies and initiatives is crucial to sustain the future tactical network in a complex, symmetric combat environment. If we fail to drive innovative reform and plan for tactical network sustainment right now, the risk is threefold.

First, because sustainment is inherent to the network's design, fielding and operation, the envisioned network of 2028 may not materialize, or it may fail to meet the Army's warfighting needs. Second, with underequipped units waiting on key C5ISR systems stuck in long repair turnarounds, critical data communications and intelligence would be slowed or prevented from moving where Soldiers need it. And third, the Army would lose opportunities to collect and analyze data and glean insights to make better strategic and business decisions.

Ultimately, we owe it to the Soldiers who depend on C5ISR network equipment and reliable data transmissions to succeed in these efforts at all levels. With their mission and lives at stake, we will not rest in pursuing our mission of empowering the Soldier with sustained C5ISR readiness, anytime, anywhere.

For more information, go to <https://www.cecocom.army.mil>.

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*MAJ. GEN. RANDY S. TAYLOR served as commanding general of CECOM and senior commander of Aberdeen Proving Ground, Maryland, from April 2017 to June 2019. In that role, he was the U.S. Army's C5ISR materiel integrator, responsible for enabling warfighting readiness by providing sustainable global C5ISR support. For his next assignment, he has been selected to serve as chief of staff at U.S. Strategic Command.*





#### FLEET MANAGEMENT

Soldiers from the 3rd Brigade Combat Team, 25th ID train on a Tactical Communication Node – Lite (TCN Lite) at Schofield Barracks, Hawaii, in September 2018. “We need reliable access to network services to enable the commander to make decisions based on information across every warfighting function,” said Lt. Col. Malcom Bush, assistant chief of staff, G-6 for the 25th ID, and on-the-move tactical network equipment like the TCN Lite increases the unit’s survivability. (U.S. Army photo by Amy Walker, PM Tactical Network/PEO C3T Public Affairs)



# SYNCHRONIZATION IS KEY

Training and fielding network modernization requires a fully unified effort to ensure force readiness with the least possible disruption.

*by Brent Smith, Lawrence Holgate and Amy Walker*

To retain technological advantage over peer and near-peer adversaries, the Army must continually improve its ability to share data across the network—from the foxhole to the Pentagon. In support of that objective, the service conducted training and fielding of multiple new network transport capabilities across the 25th Infantry Division (ID), at Schofield Barracks, Hawaii, in three months.

Fielding numerous capabilities across a division in a short window of time provides distinct advantages: It saves resources, money and time for all stakeholders involved, and provides the unit ample time to train on the capabilities in operational exercises before they go on real-world missions. However, even more than other fielding efforts, it also requires a fully synchronized and unified approach to ensure force readiness with the least possible disruption to the units.

The Project Manager (PM) for Tactical Network, assigned to the Program Executive Office for Command, Control and Communications – Tactical (PEO C3T), fielded the new network communications equipment to enhance the division's ability to exchange data and increase its operational flexibility, agility and the ability to “fight tonight.”

Looking ahead, PM Tactical Network continues to plan, synchronize and execute unified fielding efforts across the force, including the 82nd Airborne Division, 3rd Infantry Division and 1st Armored Division. As technology advances, the organization will continue to conduct unified fielding efforts to efficiently and effectively modernize tactical network transport capability across the force.



**EXPEDITIONARY,  
MOBILE, SIMPLIFIED,  
RESILIENT**

U.S. Pacific Command (PACOM) “encompasses smaller, disparate land masses with great distances of water between them,” said Maj. Grant Bramlett, communications officer for 3rd Infantry Brigade Combat Team (IBCT), 25th ID. “Due to the expanse and nature of the PACOM environment, it is imperative that the communications capabilities at every echelon be lightweight, simple to use and durable. The fielding of this new equipment allows us to retain that operationally ready state as it extends and strengthens our lines of communications and, in parallel, reduces the amount of equipment necessary to be immediately lethal upon arrival.”

These new systems included the Modular Communications Node – Advanced Enclave, a more expeditionary solution to exchange intelligence data; Coalition Network Extension Packages, which enable coalition network data exchange; and Secure Wi-Fi, which enables the network to come up in minutes versus hours of installing cables in a command post. Systems also included the Global Broadcast System, which provides one-way transmission of large data files like maps and video; and an improved battle-field video conferencing capability.

These systems were fielded to 25th ID units from January to March 2019 at Schofield Barracks, Hawaii. Additionally, as requested by the unit, PM Tactical Network fielded the inflatable Transportable Tactical Command Communications (T2C2) satellite terminals to the unit ahead of schedule, in November 2018, at the same location. T2C2 can be jumped

on the backs of paratroopers or air-dropped to support initial entry missions, and it can be used in more mature operations to provide network connectivity at the tactical edge.

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***PM Tactical Network cross-trained engineer teams that can now support multiple capabilities and a more unified network, reducing the number of engineers and fielders that it needs to send to a fielding site.***

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“Prior to this fielding, legacy network capability offered somewhat of a ‘one size fits all’ capability, not always conducive to the roughest of terrains,” Bramlett said. “This tool suite allows us to plan and prepare for a wider variety of mission sets, as we are now able to tailor our communication capabilities to our actual needs.”

Ahead of this fielding effort, the 25th ID’s headquarters and two IBCTs exchanged their legacy at-the-halt tactical network equipment for enhanced on-the-move configurations. PM Tactical Network not only reduced system complexity and increased the reliability of these network vehicle integrations, but it also reduced the size, weight and power, making them more expeditionary. These enhancements include the modernized Tactical Communications Node – Lite and Network Operations and Security Center – Lite; and the Next Generation Point of Presence

and Next Generation Soldier Network Extension.

“As America’s Pacific division, the 25th Infantry Division continuously engages and trains with partners across the Pacific region,” said Lt. Col. Malcom Bush, assistant chief of staff, G-6 for the 25th ID. “The division stands ready to deploy anywhere in the world to conduct operations ranging from humanitarian assistance and disaster relief to decisive action in support of unified land operations. We need reliable access to network services to enable the commander to make decisions based on information across every warfighting function. The [on-the-move tactical network equipment] allows for the dispersion of those warfighting functions, which increases our survivability.”

**UNIFIED AND  
SYNCHRONIZED**

PM Tactical Network synchronizes network fielding efforts across the PM and PEO C3T to see where it can combine efforts and resources to increase efficiencies as much as possible. To begin the fielding process, the PM receives initial direction to field a unit from Department of the Army G-3/5/7 and PEO C3T. The Army facilitates the Mission Command Modernization Priority List, signed by its director of force modernization. Part of that document is the agreement with the Army service component commands, Army National Guard and Army Reserve that they can support fielding to the units on the list.

The priority list doesn’t specify exactly when a unit will receive equipment, but it identifies which units should receive a new capability sooner based on operational



### ONE MORE ROUND

Soldiers assigned to the 25th ID fire an artillery round during Operation Lightning Strike 2019, a joint, live-fire exercise conducted in April in Hawaii. Units from the 25th ID will take part in additional operational training exercises this year to test new tactical network communications capabilities, and PM Tactical Network has adopted a synchronized fielding approach to support those exercises. (U.S. Army photo by Pvt. Lawrence Broadnax, 25th ID)

need for that particular year. Commanders have short windows of time to be fielded with new technology and make it work seamlessly within their battle rhythm. It's up to the PEO and PM to work with the units to find enough time on the calendar that doesn't interfere with a unit's training exercises or mission support. Once the dates are lined up, the PM tries to maximize economies of scale by fielding as many systems as possible that are ready and can be configured in a unified manner, so units are disturbed only once, or as few times as possible.

PM Tactical Network not only looks at unit availability, but also works with the unit to define the availability of different military operational specialties. If it can get enough specialties to train in the same window, the PM can field and train multiple capabilities for that unit simultaneously.

Today, the Army builds systems-of-systems that are interlayered and interconnected. With this in mind, PM Tactical Network cross-trained engineer teams that can now support multiple capabilities and a more unified network, reducing the number of engineers and fielders that it needs to send to a fielding site. To further increase efficiencies and decrease the burden on units, the fielding site leads and field engineers supporting the program office are stationed at selected active Army posts across the country, enabling them to more easily engage units during fieldings and help synchronize modernization efforts, providing stability and continuity.

During integrated process team meetings, the PM Tactical Network fielding team, together with members of the PEO C3T Readiness Management Division, work together to overcome challenges and to synchronize current and future system and





#### ALL-HANDS MEETING

Soldiers from the 2nd Brigade Combat Team, 25th Infantry Division support a Secure Wi-Fi risk reduction event in August 2016. Using the Secure Wi-Fi capability instead of cabling reduces the time it takes to set up and tear down a command post from hours to minutes, increasing maneuverability and operational flexibility. (U.S. Army photo by Amy Walker, PM Tactical Network/PEO C3T Public Affairs)

technical insertion fielding and training efforts, shipping, unit hand receipts, unit deployments and other efforts. Schedules change frequently, and one change can cascade into several more.

For this reason, the PM holds both monthly integrated process team meetings and biweekly scheduling meetings, and it partners with Department of the Army G-3/5/7 and PEO C3T for the weekly mission command synchronization meetings. These meetings ensure that staffs and teams are synchronized to meet priorities on the Mission Command Modernization Priority List or are adapting to approved changes based on PM Tactical Network's production allocations.

Fieldings are planned for and synchronized months, sometimes years, in advance, again to avoid disrupting the unit's competing operations or requirements. As such, a fielding will include multiple in-person meetings or teleconferences between units,

their higher commands and the program managers, and that contact will increase in frequency as the established date draws near, Bramlett said.

"This allows all involved parties to repeatedly assess and respond accordingly to any issues or changes to the fielding timeline, be they unit-driven, a sourcing issue or a change in fielding priorities," Bramlett said.

As the fielding date or period gets closer, unit commanders and their staff members take part in meetings and briefings so that by the actual start, all are well-versed in what they are receiving, and how and why. For prolonged fieldings, progress meetings are conducted between the unit and program managers to ensure continuity of efforts. At the end of the fielding, the unit participates in an after-action review with the PM to go over any lingering questions, issues or challenges that may have surfaced

from the fielding or were not previously addressed, Bramlett said.

### IT'S ALL ABOUT READINESS

The Army works from the sustainment readiness model, which comprises three phases: prepare, ready and mission. Whenever possible, the Army prefers that new equipment be fielded and trained during the prepare phase, to allow plenty of time for units to become proficient. A large part of funded PM fielding efforts is comprehensive new equipment training, which ensures that units are ready to use the systems in an operational environment.

Following the PM-provided new equipment training, there must be enough time allocated for units to further train with systems during operational training exercises. It's important for combat commanders to rigorously and frequently repeat these training scenarios so that the units can be ready to support contingencies whenever called upon.

**Fielding numerous capabilities across a division in a short window of time requires a fully synchronized and unified approach to ensure force readiness with the least possible disruption to the units.**

The 25th ID units will employ the new tactical network communications capabilities in multiple operational training exercises this year, including Lightning Forge at Schofield Barracks and its combat training center rotation at the Joint Readiness Training Center, Fort Polk, Louisiana. Units also will use the equipment during smaller exercises and events.

"We train as we fight, and we remain ready by practicing as often as possible, and this includes the employment of mission command as a system," Bramlett said. "One of the biggest challenges for units is how to meet all of their personnel, equipment and training requirements for a successful fielding, while remaining at an acceptable readiness state and [allowing] for the continued training in other pivotal areas."

### CONCLUSION

Along with unification and synchronization, fielding efforts also require flexibility to veer away from set plans if necessary to support unexpected operations. Although most fieldings are planned well in advance, sometimes the PM must support immediate special requests based on operational need. For example, the 25th ID requested that one of its units be fielded with the T2C2 in November, versus later in the year, to support an unexpected mission, so PM Tactical Network quickly rearranged and customized plans to support this Army priority.

In the end, the equipment is meant to improve readiness and to help units connect and communicate as quickly as possible. As U.S. forces face increasingly capable enemies in multidomain battles, they need to be armed with a modernized network that is easy to use, resilient, expeditionary and mobile.

"The adversaries that we face in the near future are planning and preparing against the entirety of our force," Bramlett said. "A long, slow buildup of strength [on the battlefield] is not an option in this type of conflict. Our ability to conduct effective mission command will be determined by the equipment we can carry with us."

*For more information, go to the PEO C3T website at <http://peoc3t.army.mil/c3t/> or contact the PEO C3T Public Affairs Office at 443-395-6489 or [usarmy.APG.peo-c3t.mbx.pao-peoc3t@mail.mil](mailto:usarmy.APG.peo-c3t.mbx.pao-peoc3t@mail.mil).*

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*LAWRENCE HOLGATE is the fielding manager for PM Tactical Network. He has an M.S. in logistics management from the Florida Institute of Technology and a B.S. in geology from Penn State University. He is Level III certified in life cycle logistics and is a member of the Army Acquisition Corps.*

*AMY WALKER has been the public affairs lead at PM Tactical Network for the last 10 years and was the public affairs lead at PEO C3T for the previous two. She has covered a majority of the Army's major tactical network transport modernization efforts, including Army, joint and coalition fielding and training events worldwide. She holds a B.A. in psychology, with emphasis in marketing and English, from the College of New Jersey.*





## CASSANDRA K. SIMMONS-BROWN

### COMMAND/ORGANIZATION:

Business Analytics and Audit Management,  
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### TITLE: Director

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## BIG DATA = BETTER DECISIONS

The phrase “big data” means lots of things to lots of people, but for Cassandra Simmons-Brown, it’s an important tool for reducing redundant business activities, cutting overhead costs and improving fiscal accountability—all of which lead to making better-informed decisions that ultimately benefit warfighters and taxpayers.

Simmons-Brown is director of Business Analytics and Audit Management at the Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense (JPEO-CBRND). She oversees the execution of a diverse portfolio of CBRN defense projects valued at approximately \$1.7 billion a year, across four funding sources: the military services, the Chemical Biological Defense Program, foreign military sales and Nuclear Matters, a program within the Office of the Assistant Secretary of Defense for Nuclear, Chemical and Biological Defense Programs, which coordinates modernization and sustainment of the U.S. nuclear weapons stockpile and handles nuclear counterterrorism and counterproliferation issues.

Those funding sources cover multiple appropriations—research and development, procurement, and operations and maintenance, for example—across multiple accounting systems, including the Army’s General Fund Enterprise Business System (GFEBS), the Defense Enterprise Accounting and Management System and Navy Enterprise Resource Planning, the Navy’s financial system of record.

Those systems are more than just acronyms: Harnessing new tools in analytics, they put data from a lot of disciplines—finance, budget, program management, contracts and logistics—into one place. “Previously, those datasets were stovepiped and not congruent, making it difficult to make an informed decision,” Simmons-Brown said. “But with the new tools we have, we can see so much information in one place: contracts, invoices, which congressional districts received funding, for example, and leverage that to make better decisions. For example, maybe there’s a radiological device that we could provide to every warfighter. But do we need to purchase that many? With the systems that are now in place, we can determine the number of forces working on missions that would require it. Or, when we’re considering vaccine production, we can determine more precisely how many doses we would need and when, and how much it would cost to store it.”

Simmons-Brown has been in acquisition since 1991, first as a contractor supporting several organizations, and then with the Defense Threat Reduction Agency (DTRA). She joined the Army Acquisition Workforce in 2010 as the business finance manager at JPEO-CBRND’s Joint Project Manager for Information Systems, then joined headquarters to lead the implementation of GFEBS. “What appealed to me was being a part of a team that helps maximize the Army and DOD’s buying power to provide products and capabilities to our fighting forces,” she said.

Simmons-Brown has received several awards over the course of her career, including the Defense Acquisition Workforce Individual Achievement Award for Financial



#### AWARD WINNER

Undersecretary of Defense for Acquisition and Sustainment (USD(A&S)) Ellen M. Lord gives Simmons-Brown the 2018 Workforce Individual Achievement Award. (Photo by Dirke Williams, Office of the USD(A&S))

Management in 2018. For her, the most meaningful award is the first one she received: the Undersecretary of Defense (Comptroller) Financial Management Award for Individual Achievement in Improving Financial Management Systems, for her work to implement a system “that bridged budget and accounting at DTRA in 2005,” she said. “At that time, we were still a very paper-driven organization, and processing documentation took forever. But we implemented a tool that made it possible to track requirements, expenditures, payments—it represented a paradigm shift from paper to technology for decision-making.”

That shift isn’t the only one she has seen. “I remember the first changes to reform acquisition and break down bureaucracy in 1995. We’re still making changes and looking to streamline processes even further. Policy changes and new requirements mean that the workforce is now more diversified in terms of the areas we need to learn about. It’s no longer just having a finance background; you need experience in contracting, program management—it’s all interconnected. Years ago, a logistician just handled logistics. Now, they’re involved in a logistics property audit, which requires background in several different areas.”

Simmons-Brown noted that she’s fortunate that JPEO-CBRND “promotes programs and opportunities such as Army’s Civilian Education System, Senior Enterprise Talent Management and developmental assignments.” Among the most valuable she has completed is the Civilian Education System Advanced Course. “That course provided me tools to develop my team and personal insight about how my values align with the Army and DOD,” she said. “What I learned helps me empower employees to make decisions at their levels, to build coalitions and ultimately answer the increasing demands for reliable business, financial and accounting data.”

If there’s one thing she regrets, it’s not taking advantage of the Civilian Education System programs earlier. “I should have paid more attention to developing ‘soft skills’—critical thinking, active listening and the ability to influence or persuade others—along with my technical skills earlier in my career,” she said. “The soft skills mattered most when leading and developing the acquisition workforce, influencing and changing culture, and transforming business processes. I earned my degrees and technical certifications, but then had to circle back to enhance my soft skills.”

She’ll add more tools to her arsenal over the next few months, departing JPEO-CBRND in July to attend the acquisition course at the Dwight D. Eisenhower School for National Security and Resource Strategy. She’s hoping the course helps her further strengthen the leadership skills needed to transform budgeting, financial systems and audit management. “I believe that I can improve budgetary and financial ERP [enterprise resource planning] systems to capture true cost of defining, acquiring and fielding equipment and capabilities to protect our forces. Improving financial stewardship and accountability across the Army and DOD will allow decision-makers to efficiently allocate our scarce resources.”

In addition to working to develop her own career, she mentors junior acquisition personnel. One of the ways she helps is to create a snapshot—“Where are you now, where do you want to go, and what’s stopping you from getting there? It helps the individual identify and understand their personal or professional gaps and map out a plan of actions and milestones.” Also important, she said, are leaders who take the time to develop junior personnel “no matter how busy the day is. It’s vital that we take time to invest time in mentoring and coaching to develop the workforce that’s coming up behind us.”

—SUSAN L. FOLLETT





### LEARNING ON THE GO

Project Manager (PM) Tactical Network is providing new equipment training on Transportable Tactical Command Communications – Heavy (T2C2-H) for the 50th Expeditionary Signal Battalion – Enhanced (ESB-E) at Fort Bragg, North Carolina. The Army is piloting a scalable, more agile version of its ESBs, and is fielding the 50th ESB-E with a new network equipment package that is much lighter and easier to deploy compared with that of traditional ESBs. (Photo by Amy Walker, PM Tactical Network Public Affairs)





# CCDC'S ROAD MAP TO MODERNIZING THE ARMY: THE NETWORK

Fourth in a series of articles on how the U.S. Army Combat Capabilities Development Command is supporting the Army's six modernization priorities.

*by Maj. Gen. Cedric T. Wins*

A small formation of Soldiers is dropped in the middle of a megacity as drones swarm overhead, sending a video feed of the area to a global telecommunications system where commanders analyze the information. The Soldiers move quickly, sending images through the scopes on their weapons back to teammates who are several kilometers away. The teammates view the information on their heads-up display and get orders to send out a call for fire, and the delivered rounds accurately hit the target without harming nearby civilians. The enemy can't "see" the Soldiers because their electromagnetic signature is low, and its attempts to jam the Soldiers' radios are unsuccessful.

While this scenario is futuristic, it portrays how coming battles may be fought. It also shows the importance of the network as the connective tissue that provides Soldiers with the ability to see and hear as they execute the basics of move, shoot and communicate.

To prepare for future battles, the Army is ensuring that Soldiers are ready and armed with the latest technology. The driving force behind this modernization effort is the U.S. Army Futures Command, which was created to streamline modernization efforts and field new equipment and capabilities more quickly to Soldiers. As the Army's primary science and technology (S&T) arm, the U.S. Army Combat Capabilities Development Command (CCDC), which is part of Army Futures Command, is uniquely positioned



to help shape future concepts and to synchronize and integrate S&T across the future force.

CCDC consists of seven centers, the U.S. Army Research Laboratory (ARL) and a team of scientists and engineers who discover, develop and deliver near-, mid- and far-term technology; conduct research and experimentation in state-of-the-art infrastructures, using advanced labs and equipment; and have a long history of working with hundreds of domestic and international academic and industry partners to solve some of the Army's toughest problems.

One of the key efforts that we are focusing on is the network. We need to ensure that it is reliable, expeditionary, mobile, cyber-hardened and simple to use.

The Army conducted an assessment to determine the capabilities needed to fight and win against a near-peer adversary and developed a modernization strategy that will leverage an acquisition methodology based on the rapid insertion of new technologies. While some of these technologies will be materiel solutions developed by Army researchers and scientists, many may come from entrepreneurs and small businesses that are nontraditional Army partners.

We support the Army's modernization effort by collaborating with academic and industry partners to fill capability gaps and develop mature technology that enables Soldiers to do their jobs and meet their missions. By working with industry, we capture emerging technology and figure out how we can adapt it for military use. Some of the technology will be commercial off-the-shelf products that will be ruggedized, operationalized and integrated onto military platforms. One of the benefits of using commercial products is that the vendor can provide a solution



#### DIALED IN

Ahead of a deployment to Afghanistan, the 2nd Security Force Assistance Brigade concluded a training rotation at the Joint Readiness Training Center (JRTC) at Fort Polk, Louisiana, in late January that included training on new Integrated Tactical Network capabilities. CCDC is focusing its network development efforts in part on resilience, with the goal of building a network that can remain operational in a contested, near-peer conflict. (Photo by JRTC Public Affairs)

more quickly. Another benefit is that the vendor conducts tests on the product that the Army can leverage before making a selection.

We are also beginning to make greater use of experimental prototypes, which are more targeted to an application and aligned to the Army's network capability-set plans. We view them as an opportunity to experiment early to identify needed changes and provide opportunities to identify failures early in the development process. Early recognition that a technology or approach isn't going to meet the

Army's needs saves money and allows the Army to pivot to other promising technologies sooner.

We are also closely aligned with the Army's modernization lead for the network, the Network Cross-Functional Team. Along with the U.S. Army Engineer Research and Development Center and the Defense Advanced Research Projects Agency (DARPA), our researchers and engineers advise the Network Cross-Functional Team, as well as the other cross-functional teams that align with each of the Army's modernization priorities.

We are focusing on four network modernization lines of effort to improve the network: creating a unified network; building a simplified mission-command suite of applications; improving interoperability among Army elements along with joint force and coalition partners; and ensuring that command posts are expeditionary and survivable.

### **CREATING A UNIFIED NETWORK**

While the CCDC Communications-Electronics Research, Development and Engineering Center, more commonly known as the C5ISR Center, leads the network modernization effort within our command, the Army network supports and enables capabilities across all of CCDC's competencies—from aviation and missile defense to armaments, tank and automotive systems, and Soldier systems. Our seven research, development and engineering centers and ARL work together to develop technologies to fill capability gaps that will modernize the network.

As a key component of all of the modernization priorities, a reliable, resilient network is critical to ensure seamless connectivity in any operationally contested environment. A unified network will provide commanders with multiple network connectivity options through a combination of tactical radios and waveforms, commercial cellular capability, military and commercial satellite communications and hardware systems that support network transport.

We recognize the need to quickly adapt to alternative networking solutions as the mission dictates. Similar to commercial cellphones that switch seamlessly between cellular, Wi-Fi and other communication solutions, the Army needs a “kit bag” of

communications solutions. The difference, however, is the type of solutions and the mobile architecture required to support the Army. We are making significant S&T investments in this space to address the Army's needs. Our network S&T strategy centers on automation and intelligence, resiliency and situational understanding.

**We have to work  
the whole range  
of research,  
development and  
engineering now  
if we want new  
technologies  
to build new  
capabilities for the  
future fight.**

One of our focus areas is automating capabilities to reduce the burden on Soldiers. For example, we are working with the Network Cross-Functional Team to automate the primary, alternate, contingency and emergency plan for the Army, which identifies what will happen to the network if individual links become inoperable or are jammed. The current plan is an often-difficult and time-consuming manual process, and critical information is often delayed. The modular radio frequency communications effort will automate the primary, alternate, contingency and emergency plan, and transition the cognitive burden of managing multiple radios and

radio networks off the Soldier. The system will enable connectivity in contested and congested environments, using automation and intelligence to optimally move data between radio-frequency and networking technologies. This will be accomplished by considering data type and destination, priority and quality of service before automatically selecting the optimal transport link to send end-user data.

We are also focusing on resilience. The Army needs to build network technology that can remain operational in a contested near-peer conflict. This includes use of low-observable (stealth) communication techniques to make the Army network difficult for the enemy to detect, and anti-jam techniques whereby the network technology will identify and adapt to remain operational during an electronic warfare or cyberattack. We are also actively working to determine whether the anticipated low- and medium-Earth-orbit commercial satellite constellations can be successfully employed by the Army to improve the resilience of our networks. These capabilities may not be available for many years but have the potential to significantly improve Army networks.

### **A SIMPLIFIED MISSION COMMAND SUITE**

To reduce the complexity in existing mission command suites, the Army is developing the Common Operating Environment, which comprises six interoperable computing environments. Within mission command, the three primary computing environments are the Command Post Computing Environment, the Mounted Computing Environment and the Mobile/Handheld Computing Environment. CCDC is working with the Network Cross-Functional Team to



## The network is the connective tissue that provides Soldiers with the ability to see and hear as they execute the basics of move, shoot and communicate.

ensure that the commander and staff have a seamless, intuitive common operating picture across these computing environments. The Army plans to field an initial version of the Common Operating Environment in FY19, leveraging commercial software solutions adapted for military use.

### IMPROVING JOINT-FORCE INTEROPERABILITY

Since the Army does not fight alone, interoperability with coalition partners is one of its top priorities. Having a common operating picture across allied forces and sharing and exchanging data are critical to supporting future conflicts.

We are working to enhance the Mission Partner Environment, which includes information-sharing policies, potential partner capabilities and compatibility with Army communications and information technology (IT) systems. The environment will ensure that Army forces can more effectively interact, technically and operationally—a priority for combatant commanders who rely on joint and multinational interoperability. Some of the critical information that commanders will be able to leverage and share includes logistics, terrain, fires and friendly and enemy position data.

### ENSURING COMMAND POST SURVIVABILITY

As the main hub where commanders control operations, command posts include equipment, information systems and networks that, today, may take many hours to set up or tear down and many hours to ensure connectivity. Additionally, because they tend to have large electromagnetic, visual and noise signatures, they are often easily detected by adversaries.

Today's military formations need to be agile and survivable on the modern battlefield, so we are working on solutions that enable seamless, connected command collaboration across mobile command post vehicles. Additionally, we are developing new ways to reduce adversaries' ability to detect our command posts. The CCDC C5ISR Center has worked with many units over the past few years to experiment with a variety of command post

prototypes in the field around the world, and has fed the results and lessons learned from those events back into the acquisition process, leading to better solutions for commanders and Soldiers in the future.

### READY, SET, FIELD

As part of the Army's decision to alter the way it develops requirements and evaluates and procures technology, it pivoted to a two-year incremental capability-set fielding approach, starting in FY21. Capability sets will build off each other and close critical capability gaps by fielding network systems that are infused with commercial solutions and informed by Soldier-led experimentation. These experiments will focus beyond today's current network baseline and look toward enhanced capabilities that align with the four network modernization lines of effort. This will speed up requirements development and approval, and provide an open architecture and standards for industry innovation.

Inserting technology in two-year capability sets provides flexibility to augment and integrate information technology capability as it emerges from industry. We are adapting our S&T efforts to support this approach.

### TELL US HOW IT WORKS

To achieve creative solutions, we must foster an environment that allows everyone to understand the problem space and experiment with new ideas and concepts to advance each successive capability set.

Experimentation using prototypes enables us to learn early lessons about how the equipment performs in a realistic environment, how Soldiers will use the equipment, and what capabilities should be included in the final product. Lessons learned from experimentation and demonstrations inform the Futures and Concepts Team and the Network Cross-Functional Team as they write requirements and develop the operational concepts for next-generation capabilities.

The Army Network Modernization Experiment 2019 (NetMod X), which was conducted from May through June, was a field-based



### SYSTEM OF SYSTEMS

Soldiers from the 57th Expeditionary Signal Battalion, 11th Theater Tactical Signal Brigade train on new Combined Enterprise Regional Information Exchange Network Extension Packages, known as CX NEPs, at Fort Hood, Texas, in February. CX NEPs fill a gap in coalition mission command capability and enable the exchange of data between U.S. joint and coalition force networks. (Photo by Amy Walker, PM for Tactical Network Public Affairs)

research-and-development experiment that assessed communications systems for simple and complex interference techniques for calls to fire. Held at the C5ISR Center's Ground Activity at Joint Base McGuire-Dix-Lakehurst, New Jersey, the two-part experiment provided an opportunity for S&T experts to use their technologies in a contested environment. Feedback from NetMod X 2019 will be used to identify technical gaps

to refine technical metrics and areas for improvement.

NetMod X 2019 also included a "radio rodeo" that will help the Army understand the capabilities and performance limitations of current radio systems in contested environments. This will help guide the Army as it develops S&T prototyping solutions for a robotic combat vehicle wireless tether. These solutions may also

have applicability in supporting other Army efforts to overcome radio-contested battlespaces.

The C5ISR Center and the U.S. Army Training and Doctrine Command (TRADOC) Cyber Center of Excellence jointly conducted another experiment, Cyber Blitz, to inform the Army on employing evolving cyber electromagnetic activities. Cyber Blitz 2018 built on two





### MONITORING THE SITUATION

The 2nd Cavalry Regiment used its on-the-move Tactical Network Transport during a live-fire exercise at Rose Barracks, Germany. The core Tactical Network Transport equipment is the backbone of the Army's upper tactical internet and supports mission command functions with a full range of voice, video and data communication. (Photo by 1st Lt. Ellen C. Brabo, 2nd Cavalry Regiment)

previous experiments, and examined how integrated cyberspace, electronic warfare, intelligence, space and information operations could help a brigade combat team gain and maintain the advantage against a regional peer in multidomain operations. The close collaboration between the NetMod X 2019 partners during the S&T demonstrations led to new tactics, techniques and procedures for cyber electromagnetic activities that the TRADOC Cyber Center of Excellence will develop.

Cyber Blitz 2019, which is scheduled for September, will be executed in concert with the Army's Orient Shield exercise as part of its plan to expedite the maturation of cyber technologies and doctrine. This will be one of the first concrete examples of cyber materiel development and experimentation linking up with an actual Army-level exercise.

### TEAMING WITH THE NETWORK CFT

The C5ISR and ARL teams work closely with the Network Cross-Functional Team, the Program Executive Office for Command, Control and Communications—Tactical and other S&T representatives to align the portfolio to balance risk and innovation and to resolve technically challenging problems. To support near- and mid-term S&T technology, CCDC replanned and modified 38 projects during development of the Program Objective Memorandum for the 2020-2024 fiscal years with the Network Cross-Functional Team in order to reprogram funding to speed network development. Aligning programming to support objectives will enable us to effectively transition S&T to programs of record.

While CCDC is responsible for most of the S&T funding in the network portfolio, partnerships with the Engineer Research and Development Center, the U.S. Army Space and Missile Defense Command and the U.S. Army Medical Research and Materiel Command, as well as DARPA, the Office of the Secretary of Defense, the National Security Agency and other services, have been key in identifying joint opportunities for network modernization and interoperability improvements.

Because the network touches all of the modernization priorities, the Network Cross-Functional Team is horizontally integrated with all of the cross-functional teams. This enables us to capture the interdependencies of all of the cross-functional teams to help inform the network design, and enables the teams to leverage technical successes to develop the “best of the best” technology.

# ***The Army needs to build network technology that can remain operational in a contested near-peer conflict.***

CCDC supports the Network Cross-Functional Team by providing research, development and engineering for S&T, looking at both near- and far-term technology. In addition to delivering technology for several capability sets, we support efforts for the National Defense Strategy, which targets 2028, and we are looking beyond the network-after-next for long-term technology that will be applied in the future. We have to work the whole range of research, development and engineering now if we want new technologies to build new capabilities for the future fight.

## **LINKING WITH INDUSTRY AND ACADEMIA**

We work alongside domestic and international industry and academic partners to develop innovative technologies that will become key capabilities for the Army. Sharing information and collaborating reduces duplication and supports the effort to field technologies more quickly, which is critical to the Army's modernization effort.

One way that we partner with industry and academia is through cooperative research and development agreements, which allow Army researchers to exchange technical expertise and share information, facilities and equipment with industry. This enables the vendors to understand the Army's needs while the Army evaluates the vendors' technology in an integrated lab and network environment. Our C5ISR Center has nearly 40 such agreements with industry and academia in support of the network.

One example is the C5ISR Center's partnership with five commercial radio vendors to establish agreements to address a gap in the Next Generation Combat Vehicle's wireless control tether. Through the agreements, the C5ISR Center briefed the vendors on current threats and capabilities as well as vulnerabilities that have been identified in each of their systems through lab-based

analysis. At least two of these vendors mitigated the vulnerabilities in their systems during NetMod X. The C5ISR Center is in the process of establishing collaborative research and development agreements with seven additional commercial radio vendors.

The C5ISR Center is also establishing a Blue Force Tracking Consortium that leverages collaborative research and development agreements for industry participation. It will tie into the development of an open-standard architecture that enables rapid technology insertion. This will address the need for flexibility and agile communications through open standard interfaces, providing industry partners with defined boundaries and system context for the functionality needed throughout the network. The goal is for industry to insert and integrate new technology into systems that are interoperable throughout the Army.

We also share information through requests for information and by hosting industry days and technical exchange meetings with the Network Cross-Functional Team. We expect industry to outpace some of the developmental technology that we are working on, so these meetings give us an opportunity to identify potential technology solutions the Army can adopt or adapt.

## **CONCLUSION**

We have made tremendous strides in our effort to provide a robust network that will give Soldiers a tactical edge in communications on the battlefield. We continue to look for ways to partner with academia and industry on projects that support our effort to provide Soldiers with next-generation technology so they are prepared to fight and win against any adversary in multidomain operations.

As Gen. John M. Murray, commander of Army Futures Command, said, "This is an iterative build to the end state. We never truly reach the end state; the end state is constant innovation."

*For more information, go to the CCDC website at <https://www.army.mil/ccdc>.*

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*MAJ. GEN. CEDRIC T. WINS is the commanding general of CCDC. He graduated from the Virginia Military Institute and was commissioned in the field artillery in July 1985. His military education includes the Field Artillery Officer Basic and Advanced Courses, U.S. Army Command and General Staff College and the National War College, where he earned an M.S. in national security and strategic studies. Wins also holds an M.S. in management from the Florida Institute of Technology.*



## FROM REQUEST TO REALITY

It takes a fair amount of horse-trading before a DOD budget request goes from the Pentagon to the White House for inclusion in the president's budget submission to Congress. (Image by U.S. Army Acquisition Support Center (USAASC)/Getty Images)



# NO MYSTERIES, PLEASE

Budgeting for Army acquisition programs is both art and science, in which clarity and consistency set the tone for success.

*by Margaret C. Roth*

If every program has a story, mystery is never the genre of choice. Taking an Army acquisition program budget from concept to reality is a complex undertaking. The vision may be simple, but the potential plot twists are numerous when you factor in the number of programs involved (more than 600) and the thousands of people involved (in the 13 program executive offices (PEOs), the Pentagon and Congress, but who's counting?).

It's a process that doesn't tolerate abstractions well, said Lt. Col. Stephen Miller, who until his recent reassignment worked on budget planning and execution for the deputy assistant secretary of the Army (DASA) for plans, programs and resources (PPR). A fair amount of horse-trading goes into every DOD budget—albeit at the higher levels of authority—before it goes from the Pentagon to the White House for inclusion in the president's budget submission to Congress. And you can't make trades without knowing what you have to gain or lose.

Miller, who served as a program management functional area officer in a broadening assignment with the DASA PPR, had a pivotal role in developing the next budget for the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)) and executing the spending appropriated in the previous year.

As part of the first half of his role, he worked on the “J-books” that PEOs submit to ASA(ALT) to justify why they need the money they want the Army to request from Congress. (The “j” is for “justification,” but more on J-books shortly.) There are definitely right ways and wrong ways to explain why Congress should spend taxpayer dollars to support a program, according to Miller and others within ASA(ALT) who have



## ON THE HILL

Lt. Gen. Charles D. Luckey, chief of Army Reserve and commanding general, U.S. Army Reserve Command, testifies in April before the Senate Appropriations Subcommittee on Defense. Generals testify before authorization and appropriations panels to explain their annual funding requests and to justify their budget proposals. (U.S. Army Reserve photo by Sgt. Stephanie Ramirez, U.S. Army Reserve Command)



been assigned to synchronizing the budget process and executing expenditures.

Programs are categorized according to expense, with acquisition category (ACAT) I being the most expensive and ACAT IV being the least. But it doesn't matter whether a program is ACAT I or ACAT IV, Miller said; all acquisition programs go through the exact same process to get funding.

"Each system has its own place in the Army and in the requirements," explained Lt. Col. Anthony Passero, financial synchronization officer for the DASA PPR. "Just because you're in an ACAT III or an ACAT IV program doesn't mean you're at risk of not being funded. So it's all about how well you do your staff work and how well you write your justification."

## THE PLAYBOOK

It helps at this point to understand who the major players in the process are, and their order of appearance.

The program management offices develop J-books for the PEOs, who then submit them to ASA(ALT) and the Army Budget Office, where the staff compiles them. The Office of the Secretary of Defense reviews the J-books, then sends them back to the budget office and then to ASA(ALT) for revisions before submitting the

Army's request as part of DOD's budget submission to the president's budget request.

Simultaneous with this process, senior defense leaders are testifying at formal hearings on Capitol Hill about Army budget priorities, as well as discussing them in informal meetings with legislators and staffers. And, within the Pentagon, the PEOs are meeting with ASA(ALT) leadership to brief them on their programs' plans and progress.

Two primary groups allocate resources within the Army acquisition enterprise: the Equipping Program Executive Group and the Sustaining Program Executive Group. As their names imply, they each focus on a particular phase of a program's life cycle. The Army acquisition executive (AAE) has approval authority over each.

Equipping is for new programs, and the AAE shares that authority with the other co-chair, the U.S. Army Futures Command. The sustaining group is co-chaired by the U.S. Army Materiel Command, which manages sustainment programs.

Until last year, the deputy chief of staff, G-8 (programs) and the AAE co-chaired the equipping group, and the G-4 (logistics) and AAE co-chaired the sustaining group. Then-Army Chief of

Staff Gen. Mark A. Milley inserted the commanders into the co-chair seats starting in FY19, a change that makes them both more involved in budget decisions and more accountable for them.

By virtue of its role as co-chair of the equipping group, for example, Army Futures Command channels the spending priorities that have been formally reviewed and set in conjunction with its eight cross-functional teams into the Army's budget request.

Contrary to what one might expect from the budget process, most of the actual horse-trading happens at a higher level inside the Pentagon during a separate but related process to develop the five-year program objective memorandum, well before the Army's budget request goes to Congress. The program objective memorandum is the primary document on which the services base decisions on program scope and spending, with supporting information on missions, objectives and alternatives.

The National Defense Authorization Act for Fiscal Year 2016 brought about a major shift in how these trades take place. Previously, the chief of staff delegated the verification of requirements to the deputy chief of staff, G-3 (operations and plans). With the passage of the legislation, Milley reinvigorated the approval process with the direct involvement of his office and the vice chief's.

"Now you've got the deep dives by the chief of staff of the Army. And so the horse-trading is done by him," said Passero, who shepherds the budgeting and executes spending for combat systems and Soldier equipment through the program objective memorandum cycle. "He's got all the information he needs ... and he does the horse-trading," asking the G-3 such

questions as, why are we still pursuing this capability? Is this a valid need? To which the G-3 might respond, no, and recommend putting the money elsewhere; or the answer might be, we don't need this many, our force structure has changed since the acquisition plan started.

"So there's renewed energy at finding effectiveness in how we spend our money," Passero said.

The negotiating typically continues, to a lesser extent but also at a high level, on Capitol Hill after Congress has received the president's budget submission, which usually happens in February, but not always. "Sometimes a general will be sent to the Hill to do a little horse-trading or explaining," Miller explained. For example, "[Lt.] Gen. [Paul A.] Ostrowski [principal military deputy to the ASA(ALT)] carries a lot of the mail on priorities."

If senior Army leadership holds sway in the development of the program objective memorandum, where does the power reside in determining which Army acquisition programs should receive what money in DOD's budget request? Miller listed the five most powerful entities in his view:

- **ASA(ALT)**, represented primarily by John Daniels, the DASA PPR.
- **The Army Budget Office**, headed by the deputy assistant secretary of the Army for budget in the Office of the Assistant Secretary of the Army for Financial Management and Comptroller.
- **The Force Development and Program Analysis and Evaluation** directorates under the deputy chief of staff, G-8. Force Development has a leading role in developing the five-year program objective memorandum to support

the fighting force and the capabilities it needs in the near, mid and far term. Program Analysis and Evaluation's self-described role focuses on setting priorities and supporting their funding.

- **The Office of the Secretary of Defense (OSD)**, specifically its Office of Cost Assessment and Program Evaluation (CAPE). After ASA(ALT) crafts its budget request during the summer and fall, it sends the request through the Army Budget Office to CAPE, whose issue teams look at all the requests from across the military services to see how the services' budgets reflect the priorities of the secretary of defense. Those priorities drive the "directed changes"—budget revisions, typically in the nature of, "You're going to pay more for this, less for that, give up some money to pay OSD bills," Miller explained—that go back to the services in November and December.

## INSIDE THE J-BOOK

A good J-book is way more than a USA Today article, but way less than "War and Peace"—and typically nowhere near as riveting, though an engaging narrative can only help a program's chances of approval. Technically a compilation of what are known as "procurement and R&D forms," the J-book justifies to Congress why a program needs the money that the PEO and, in turn, ASA(ALT), is asking for. "J-books lay out descriptions of what the program does, its accomplishments over the prior year, its plans for next year," Miller said. "They typically include a schedule."

Within the pages of the J-book, which collectively is the bedrock of the Army's budget request, is where a program and its managers have an incomparable opportunity to shine. A J-book can be three to four pages long, or 30 to 40 pages, Miller



said. Length is less important than scope and relevance.

He advised acquisition professionals to “ensure that their justifications are well-thought-out, well-timed and consistent year to year. A justification needs to be a stand-alone product” that a Hill staffer can look at, understand without needing to refer to other documents, compare to previous years’ justifications and see “transparency and consistency,” Miller said. The question acquisition professionals should ask themselves, as they explain why they need the money they’re requesting, is, “Am I telling Congress the same story I told last year and, if not, am I telling them why?”

“The staff that are going to review this are really looking at, is the Army doing what they said they were going to do? Has something changed from what they said they were going to do?” Miller said. “And is what they’re doing the most responsible and effective way to do it, as opposed to just going out and burning cash, throwing good money after bad?”

**“Sometimes a general will be sent to the Hill to do a little horse-trading or explaining.”**

For Passero’s part, “The one thing that I would want the Army Acquisition Workforce as a whole to understand is that they do send out valid requirements, but not all those requirements can be resourced.” When they’re crafting their justification for what they want, “it’s a writing contest—what you say influences senior leaders. So if you can craft your story better than other people, you’re probably going to get funded, right?”

“One, you want to make sure the operational need is there. ... We, at ASA(ALT), don’t make up the requirements. The operational need is supposed to be given to us from the G-3 and G-8. And so you just want to make sure that when you’re

writing your justification, you’re thinking in line with the operational need.”

To which Lt. Col. Raymond Yu, a fellow financial synchronization officer, added that, in addition to covering what the operational need, “We, as the materiel developers, [need to] explain how what we are pursuing gets after that operational need in the most timely, effective and resource-responsible methods.”

There’s also the need to maximize the Army’s buying power, said Maj. Scott M. Davis, also a financial synchronization officer with DASA PPR. “The ability to prioritize and trade to protect that [budgeted money] is key, especially



## JUSTIFICATION BOOKS

A compilation of procurement and research and development forms known as “J-books” explain to Congress why a program needs the money that a PEO and ASA(ALT) are asking for. (Image by Abscent84/Getty Images)

considering that it's a fixed amount of money inside the DOD budget, which means sometimes other services or OSD would like to pay their bills out of our dollars if possible.

"Congress has a fixed amount of dollars they have to manage, and they have special interests that they want to look at funding as well. So the key thing [program managers] need to know [is] if you're unable to execute those dollars ... don't hesitate to offer them back to the Army. The Army can use them wisely and then work within the appropriate [fiscal] cycles to get that money back when you do need it or can execute it. We'd rather the Army take the money than OSD or Congress."

### PROGRAMS ON PARADE

If there is a muse to guide the preparation of something as dry as a J-book, it might be the congressional staffer.

In making decisions on the Army's program funding requests—in the case of ASA(ALT), mostly procurement and research and development dollars, as opposed to the operations and maintenance dollars that make up the bulk of a U.S. Forces Command unit, for example—Congress dissects them down to "a very fine level of detail: which widgets, why, how many and with what parts: how many dollars on part A of the widget, how many on part B," Miller explained. That is in contrast to the budgeting and distribution of operations and maintenance funds, whereby the Army organization requesting funds for operational training says more simply, "We're doing training" and Congress assigns resources for training.

Leading this dissection process are the staffs of the key defense committees and subcommittees charged with authorizing DOD programs and approving specific



### GETTING OFF THE GROUND

Capt. Kristopher Hartwell, assistant product manager for Soldier Maneuver Sensors within PEO Soldier, tests a Soldier Borne Sensor, used for aerial reconnaissance and surveillance, at the Rock Island Arsenal – Joint Manufacturing and Technology Center (RIA-JMTC) in Illinois. Whether ACAT I or ACAT IV, all acquisition programs go through the exact same process to get funding. (U.S. Army photo by Debralee Best, RIA-JMTC)





### DASC PARADES

After the president's budget request goes to Congress, Capitol Hill staffers go to ASA(ALT) for briefings by Department of the Army system coordinators in their areas of oversight. (Image by USAASC)

funding amounts for them. Capitol Hill staffers “do the vast majority of the legwork, face time and bill-writing,” Miller said.

In April, after the president has sent the budget request to Congress, Hill staffers take part in “DASC parades,” trooping over to ASA(ALT), where Department of the Army system coordinators brief them on the budget requests in their areas of oversight. (More on DASCs shortly.) The briefings are by request; not every budget line merits a meeting with Hill staffers of the authorization or appropriations committees, Miller said. Typically the DASCs brief ACAT I programs and any ACAT II, III or IV programs of particular interest to Congress. The justification for other programs relies solely on the J-book; hence the need for stand-alone documentation.

The 100 or so DASCs, each of whom reports to one of seven directors under the ASA(ALT)'s deputy for acquisition and systems management, make ASA(ALT)'s case for why a program needs support, while the Hill staffers listen and ask questions. The staffers know the legislators' priorities and how they are likely to decide on a particular program, which guides their questions and discussion. They tend to “focus a lot on what's changed from the previous year's request,” Miller said.

A single DASC, whether military or civilian, might be responsible for two or three ACAT I programs, or a basket of ACAT II and III programs, serving as the program expert for those programs in the Pentagon and the liaison between ASA(ALT), the program, the various Army staff and secretariat sections.

## NEED TO KNOW: AN ARMY ACQUISITION BUDGET FAQ

### **Q: What are the key characteristics of a sound justification document?**

A: A sound justification document clearly explains the source of the requirement, the schedule for meeting the requirement, the funds necessary to meet the requirement and the strategy to obligate and execute the requested funding. Further, a sound justification will clearly address any changes in requirements, schedule and funding from the previous year's justification.

### **Q: I have a question about the budget, the budget process, or a year of execution bill needed to get DA approval for reprogramming already appropriated money. Who should I contact?**

A: It is best to always start with your PEO's business management office and work with them to contact your budget and execution analyst in the Office of the Deputy Assistant Secretary for Plans, Programs and Resources (DASA PPR). The analyst assigned to your PEO's portfolio will be able to address your question directly, or research and coordinate a response across the Army Staff and Secretariat. Your best point of contact in the Office of the DASA PPR is Karen Walker, director of financial operations, at [karen.a.walker.civ@mail.mil](mailto:karen.a.walker.civ@mail.mil).

### **Q: I am a product manager for a PEO. Can my staff and I expect to hear directly from congressional staffers about details of my program, or do their questions all go to someone in ASA(ALT)?**

A: It is possible for program offices to hear directly from staffers. It is imperative that program managers (PMs) develop and receive

appropriate approval for responses as rapidly as possible, because if a staffer is calling directly, that means they are actively considering a mark, an addition or decrement to the requested funding, and they will not wait long for a response.

### **Q. In terms of building professional relationships, are there certain people in the Pentagon and on Capitol Hill who I will be working with on budget issues on a regular basis as a PM?**

A: On a regular basis, PMs should maintain contact with the following people and organizations:

- **DASA PPR:** budget and execution analyst and financial synchronization officer.
- **Office of the Deputy for Acquisition Systems Management:** your program's Department of the Army systems coordinator.
- **G-8 Force Development Directorate:** Staff synchronization officer.
- **Army Budget Office:** appropriation sponsors.

With regard to Capitol Hill, PMs should always work through their command and/or ASA(ALT) Congressional Affairs.

### **Q. Is there any recommended reading on the budget process?**

A: Defense Acquisition University offers online classes that are easily accessible to the Army Acquisition Workforce. Also, the book "How the Army Runs: A Senior Leader Reference Handbook," is available in print and digitally.

—**ARMY AL&T and  
DASA PPR STAFF**

As such, they are attuned to the budget process, the G-8 for the program objective memorandum process, and G-3 and G-8 for requirements, and are intimately familiar with the who, what, why, when, where and how of spending requests.

The focus of the DASA PPR, by contrast, is more strategic in terms of understanding the Army's message and how a program ties into the overarching Army strategy or the Army plan.

In addition to the DASCs leading the briefings, program managers at the O-6, or colonel, level may participate in the DASC parades, along with representatives of the G-8, the Army Budget Office and now the cross-functional teams of Army Futures Command.

"The thing that makes DASC parades successful is explaining changes proactively and being consistent year to year," said Miller, a former DASC. "The DASCs who run into problems are the ones who try to gloss over changes" from a previous justification for the same program. "So identify that change in the justification document, explain that change and tell them why this is in the best interest of the Army and of the taxpayer to make that change."

"Transparency is key, trust is key," said Maj. Jeffrey Sacks, a former DASC and currently a financial synchronization officer. "Those are probably the biggest things that [members of Congress] look for, and clarity as well. Once you lose trust and try to hide money and are not forthcoming, it can snowball into a really negative thing." Yu added, "It's not really just trying to hide. It's [that] if we do a poor job of explaining change or explaining why something increased or why something decreased, then it looks



like we're trying to hide something. And they're going to ding us by default."

"The popular phrase here in the building is, 'Mysteries are a bill-payer,' " Miller said. Bill-payers are programs whose resources are diverted to pay for other programs. "If you create a mystery for an appropriator, they're going to take your money and pay for something else."

"That holds true at the OSD and the Army level, too," said Sacks.

ASA(ALT) encourages members of the Army Acquisition Workforce to learn more about writing effective J-books through workshops that bring together former congressional staff members and acquisition professionals to train the latter in delivering the kind of program justification that Congress is looking for.

The idea is to "think like an authorizer, think like an appropriator," Sacks said. "If I do that, then theoretically that's going to help me write, because I know what they're looking for. There are no magic words that you're going to put in the justification document per se that are going to get you the money. ... But we can do a better job at it."

Materials for the workshops are on ASA(ALT)'s knowledge management website, accessible with a common access card. "Whenever PEOs want to do it, they can do that. But we're trying to do it on an annual basis." The ideal time is in July, to sync with the budget cycle, Sacks said.

### THE FACE OF REFORM

"The Army's changing. The Acquisition Corps is changing," said Sacks. "We're doing a lot of reform initiatives and trying to get after providing the capability to the warfighter in a more cost-efficient and expedited manner."

The Army Budget Office and ASA(ALT) are examining how they can improve the budget process, notably the preparation of J-books. "Other than AFC's [Army Futures Command's]

injection and some of the chief's hand in the process, we're really executing the same PPB&E [planning, programming, budget and execution] process we've executed for years," Miller said.

Contributing to the push for reform is the Section 809 Panel, established by Congress in the FY16 National Defense Authorization Act. The 16-member panel has since published an interim report and a three-volume final report, containing a total of 98 recommendations "aimed at changing the overall structure and operations of defense acquisition both strategically and tactically," according to the panel's website.

The most recent volume, released in January, summarizes the panel's recommendations, including a section on the budget with 13 recommendations "to reduce inefficiency and dysfunction in the defense acquisition system's budget formulation and appropriations processes," such as "empowering DOD managers to reallocate resources between programs as needed; flowing down decision authority to the lowest possible levels; eliminating or mitigating some of the perverse incentives that exist in fiscal law; and mitigating the harmful effects of late funding on DOD acquisition programs."

In the end, "the general public needs to know that we're being good stewards of their money," Davis said.

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*MARGARET C. ROTH is an editor of Army AL&T magazine. She has more than a decade of experience in writing about the Army and more than three decades' experience in journalism and public relations. Roth is a MG Keith L. Ware Public Affairs Award winner and a co-author of the book "Operation Just Cause: The Storming of Panama." She holds a B.A. in Russian language and linguistics from the University of Virginia.*

**“ Am I telling Congress the same story I told last year and, if not, am I telling them why? ”**

# FUNDING KICK-START



## WIRED FOR SOUND

Sgt. Joseph Baumgartner, electronic warfare specialist with 2nd Armored Brigade Combat Team, 1st Armored Division (2/1D), fixes his equipment during a training exercise in December at Fort Bliss, Texas. Some of the equipment tested in the exercise was funded in part through the OSD Rapid Prototyping Program, and RCCTO's participation in that effort yielded lessons on how to best apply new rapid prototyping authorities and funds in partnership with OSD. (U.S. Army photo by Staff Sgt. Felicia Jagdatt, 2/1 AD)

| A new rapid prototyping program supercharges Army capabilities.

*by Vanessa Pittman and Brandon Little-Darku*

In late 2016, the secretary of the Army approved the first project for the newly formed Army Rapid Capabilities Office: electronic warfare systems for Soldiers on the front lines of deterrence in Europe. A companion project, providing position, navigation and timing capabilities, followed soon after. But receiving rapid approval also meant that, as the projects progressed during 2017, existing funding sources didn't quite cover the bill.

Both efforts were in direct response to operational needs statements from U.S. Army Europe, so time was of the essence. Waiting until the next budget cycle would be risky.

Instead, the Rapid Capabilities Office, now the Rapid Capabilities and Critical Technologies Office (RCCTO), turned its attention to a new and, at the time, little-known program within the Office of the Secretary of Defense (OSD). The 2017 Department of Defense Appropriations Act included \$100 million for a rapid prototyping program, which became the new OSD Rapid Prototyping Program.

RCCTO applied for the funds in the summer of 2017, hoping they could serve as the catalyst to get both projects to the next level of development. By August, OSD had selected eight projects from across the services to receive funding through the Rapid Prototyping Program. RCCTO received funding for both electronic warfare and position, navigation and timing—the only Army organization to receive funds that year.



In the spring of 2018, RCCTO submitted additional requests and received FY18 funds for optical augmentation technology, which will provide Army scouts the ability to detect adversary weapon systems, increasing vehicle protection and survivability. With each project, the Rapid Prototyping Program has increased the pace of progress and served as a key partner in the Army's successful development of needed capabilities.

#### A NEW PROTOTYPING PARTNERSHIP

Established in 2017, OSD's Rapid Prototyping Program is designed to accelerate services' and defense agencies' prototyping by reducing technical and integration risk, establishing affordable and realistic requirements for programs of record, and supporting timely development of fieldable prototypes—all to enable rapid modernization. The fund is structured to support the unique model of prototyping, which recognizes that a particular capability is not a "one size fits all" answer to be fielded and sustained universally across a service. Instead, a prototype capability provides an interim solution that targets a specific need, incorporating Soldier feedback and technology advances to inform longer-term solutions.

The Rapid Prototyping Program seeks a new set of innovative projects annually, awards exclusively research, development, test and evaluation funds, and has a relatively small budget. In its first year, it awarded approximately \$100 million to eight programs.

In FY18, it provided approximately \$50 million to four programs. In its third year, the program awarded approximately \$80 million to a slate of projects in April.

The program is open to applicants across the armed services. The process generally starts in August, when applicants are asked to submit a white paper that outlines the project for which they're seeking funding. The paper includes a project description, the objective, what the capability will accomplish and why it's relevant to today's threat environment and modernization efforts. Applicants also provide funding needs and plans, key participants, transition and post-prototyping strategy, project schedule, risk mitigation and metrics.

Each white paper is evaluated by the Rapid Prototyping Program Office, experts across DOD and a cross-functional team of representatives from the Office of the Undersecretary of Defense for Research and Engineering, the Office of the Undersecretary of Defense for Acquisition and Sustainment, and the Joint Staff. Winning entries are announced early in each calendar year.

After the selection phase ends, the execution process begins. Winning project leads from the services meet with program representatives. They review each project and its funding requirements in detail, making any necessary updates that may have occurred after the submission. Once a funding decision is received, the



#### COVERING NEW GROUND

Strykers from the 2nd Cavalry Regiment, negotiating the terrain of the Hohenfels Training Area, Germany, were among the first units to receive the new electronic warfare prototype systems provided by the Army RCCTO and PM EW&C and funded in part through the OSD Rapid Prototyping Program. (U.S. Army photo)

project officially kicks off, and the Rapid Prototyping Program can send funding directly and quickly to the contract agents on the project's behalf.

Throughout the process, the project managers keep the program informed via monthly updates of upcoming milestones, tests or funding issues. Included in the monthly status report is information on how much of the funding has been obligated or disbursed to date, broken down by individual funding request. Also, the Rapid Prototyping Program Office hosts a midyear program review with each project to receive more detailed information. OSD, in turn, regularly reports to Congress on the projects' progress.

#### PROTOTYPE PARTNERSHIP

The Army RCCTO selected its projects for proposals to the Rapid Prototyping Program carefully: Not only did it choose projects approved by its board of directors, which is led by the secretary of the Army, but it also picked projects that were in direct response to operational needs statements. In other words, the capabilities for which RCCTO sought OSD support were true rapid prototypes and not standard research and development efforts. Supported by Army leadership, they would go directly into the hands of Soldiers.

With OSD's help, the Army is delivering on each of these efforts.

Its first project, electronic warfare capabilities for brigade and below, fulfilled the operational needs statement from U.S. Army Europe by providing integrated prototype equipment for electronic support and electronic attack. Teaming up with the Project Manager for Electronic Warfare and Cyber (PM EW&C) within the Program Executive Office for Intelligence, Electronic Warfare and Sensors (PEO IEW&S), RCCTO delivered the first phase of the capabilities in less than 12 months. After using the money awarded by the Rapid Prototyping Program for the second phase of the project, the acquisition team continues to partner with receiving units in Europe to infuse new technology as it becomes available, to quickly deliver incremental upgrades and to inform the long-term electronic warfare programs of record. This effort was recently selected by the Office of the Undersecretary of Defense for Acquisition and Sustainment as a winner of the 2018 David Packard Excellence in Acquisition Award. (See related article, "The Making of a Packard," Page 10 in the Spring 2019 issue of Army AL&T.)

RCCTO also used the Rapid Prototyping Program to advance its position, navigation and timing project. Designed

## FUND FACTS

These programs have received funding from the Office of the Secretary of Defense Rapid Prototyping Program:

### FY18

- The Perfect Storm electronic warfare capability (Army)
- Seeker technology for hypervelocity projectiles (Navy)
- Hypersonic tracking with multimission sensors (Air Force/Missile Defense Agency)
- Optical augmentation (Army)

### FY17

- Forward deployed electronic warfare assets (Army)
- Position, navigation and timing (Army)
- Passive wide-area detection of small unmanned aerial systems (Navy)
- Ship-to-shore maneuver exploration and experimentation (Navy/Marine Corps)
- High-power microwave for air base air defense (Air Force)
- Open mission systems contribution to PlatformNxt (Air Force)
- TPY-2 Adjunct Sensor (Missile Defense Agency)
- Mission Rehearsal Trainer (Joint Staff/J-8)

**A fund RCCTO originally targeted as a short-term fix for its first two projects is becoming a solution to help the Army bring urgently needed prototypes to the field.**



in partnership with the Army's Position, Navigation and Timing Cross-Functional Team and the Project Manager for Positioning, Navigation and Timing (PM PNT), the capability—also known as Project TITAN—will provide independent timing capability if the GPS signal is denied or unavailable, and adds more robust antennas to improve signal reception in a contested environment and support freedom of maneuver. In October, RCCTO and PM PNT tested several capability elements that make up Project TITAN. This test will inform future fielding decisions, including a possible urgent materiel release for the first fielding of resilient position, navigation and timing equipment to the European theater.

In FY18, RCCTO received funds through the Rapid Prototyping Program for its optical augmentation project, which adds optical imaging sensors to high-performance weapon platforms. This effort, a partnership with the Project Manager for Terrestrial Sensors within PEO IEW&S and the U.S. Army Combat Capabilities Development Command C5ISR Center (formally the Communications-Electronics Research, Development and Engineering Center), is conducting rapid prototyping and risk reduction to enable Army scouts to detect adversary weapons. The project will produce an integrated prototype that will use the opposition's optical and imaging sensors to locate and target enemy platforms. The team completed a system requirements review

in December and is continuing design work and completion of the initial prototypes for testing.

## CONCLUSION

While all of RCCTO projects benefited considerably from the Rapid Prototyping Program, each yielded its own nuances in execution and lessons learned. For example, the electronic warfare and position, navigation and timing efforts required OSD to distribute the funds across multiple contracts to acquire almost a dozen technologies that make up the integrated solutions. Precise timing for these purchases and constant communication with users enabled the Army and OSD to manage this complexity, and to incorporate operational changes and subtle shifts



## WATERFRONT VIEWS

An unmanned aerial vehicle launches from a tactical transport vehicle during the Ship-to-Shore Maneuver Exploration and Experimentation Advanced Naval Technology Exercise at Marine Corps Base Camp Pendleton, California. The exercise, which received Rapid Prototyping Program funds in 2017, brings industry, academia and Navy researchers together to demonstrate emerging technology and engineering innovations. (U.S. Navy photo by John F. Williams, Office of Naval Research)

**The Rapid Prototyping Program seeks a new set of innovative projects annually, awards exclusively research, development, test and evaluation funds, and has a relatively small budget.**



### PLUGGED IN

Staff Sgt. Micah Sheean, an electronic warfare specialist, communicates with mobile personnel during a training exercise in December at Fort Bliss, Texas. The Army RCCTO and PM EW&C provided new electronic warfare prototypes, funded in part through the OSD Rapid Prototyping Program. (U.S. Army photo by Staff Sgt. Felicia Jagdatt, 2/1 AD Public Affairs)

in requirements as technology advanced. The optical augmentation project was simpler from a contracting perspective but less mature in its technical development, so the Rapid Prototyping Program financed more prototyping, integration and evaluation to get the technology ready.

For RCCTO, using the Rapid Prototyping Program funds also yielded lessons on how best to apply new rapid prototyping authorities and dollars in partnership with OSD. Most important to the process was keeping lines of communication open. Working through monthly status reports together, informing OSD of any upcoming training or testing events, remaining flexible and being forthcoming with information, such as changes to the capability, helped build relationships and ensured a smooth path for a still-evolving modernization concept.

Now, a fund RCCTO originally targeted as a short-term fix for its first two projects is becoming an enduring relationship and

a solution to help the Army bring urgently needed prototypes to the field.

For more information on RCCTO, go to: <https://rapidcapabilitiesoffice.army.mil/>.

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*BRANDON LITTLE-DARKU is a project lead for RCCTO. He holds an M.S. in electrical engineering from Boston University and a B.S. in electrical engineering from Norfolk State University. He is Level III certified in engineering and in program management.*





## MICHELLE HODGES

### COMMAND/ORGANIZATION:

Army Rapid Capabilities and  
Critical Technologies Office

**TITLE:** Senior contracting official

### YEARS OF SERVICE IN WORKFORCE: 18

**DAWIA CERTIFICATIONS:** Level III in  
contracting; Level I in program management

**EDUCATION:** MBA, George  
Washington University; B.B.A in  
management, James Madison University

**AWARDS:** Army Superior Civilian  
Service Award; Commander's  
Award for Civilian Service

## RAPID GETS RAPID-ER

As the in-house senior contracting official for the Army Rapid Capabilities and Critical Technologies Office (RCCTO), Michelle Hodges finds herself in a unique position. Most senior contracting officials are assigned to a contracting activity and work with several organizations. But having Hodges as an embedded resource will help eliminate unnecessary processes and enable the organization—already set up to move quickly—to move even faster.

Hodges is responsible for creating the environment for RCCTO to execute its own contracts for projects as assigned by RCCTO's board of directors, which is led by the secretary of the Army. It's a relatively new position: The head of the Contracting Activity was appointed in July 2018, and Hodges came on in January 2019. "We are building the controls and business systems to internally execute contracting actions as we prepare for strategic projects to come in from the board of directors in support of Army modernization priorities and the National Defense Strategy," she explained.

"We're starting from zero, but we have great support in the leadership and staff here. In the positions I've worked in before, I've taken for granted the systems and processes that were in place. But this role is exciting in that we get to decide what's the best approach, given our lean and agile environment and our goal to provide rapid, strategic acquisition: what do we need, what's not required, what can we rely on other organizations to help with."

RCCTO's goal is to create an environment where there are multiple acquisition pathways to discover and develop disruptive technologies. Earlier this year, the organization conducted a successful prize challenge to identify new artificial intelligence and machine learning applications for electronic warfare. RCCTO plans to stick with that approach as well as a couple of others, Hodges noted. "In addition to the prize challenge, we have a broad agency announcement that continuously accepts pitches from industry in the form of very short white papers that RCCTO can quickly evaluate and further engage," she said.

Additionally, RCCTO will issue a commercial solutions opening under a pilot program to look at commercial technologies that can advance the state of the art; host more prize challenges in specific topic areas; and may hold RCCTO pitch days with real-time feedback. "With these various avenues for discovering new tech, the contracting possibilities are endless: Prototypes, [other-transaction agreements], cooperative agreements and even traditional FAR [Federal Acquisition Regulation]-type contracts can be accelerated to meet the demanding rapid prototyping and fielding schedules," she said.

Hodges got her start in acquisition nearly 20 years ago as a contract specialist intern with the Defense Supply Service – Washington (which eventually became part of U.S. Army Contracting Command), providing Army staff offices with support services and information technology purchases. Early in her career, she worked for Headquarters, U.S. Army Materiel Command when it was at Fort Belvoir, Virginia.



## CONTRACTING POWER

Hodges confers with teammates Mike Foster and Maj. Isaac Lewellen. Hodges has led the creation of an environment in which the RCCTO can execute its own contracts for projects, as opposed to relying on an external contracting organization. (Photo by Catherine DeRan, U.S. Army Acquisition Support Center)

“I was fortunate enough to have a mentor who told me not to stay in the headquarters and instead get operational experience, which would give me a better perspective later in my career.” She became a contracting officer with what was then the U.S. Army Communications-Electronics Command’s acquisition center, working with the Project Manager for Countermine and Explosive Ordnance Detection. There, she had the opportunity early in the war in Afghanistan to support route clearance missions through urgent requirements that came from research-and-development and went out in theater for operational assessments.

Hodges and her team found non-developmental and commercially available capabilities, adapted them and fielded them quickly. The Husky Mounted Detection System used a ground-penetrating radar to detect anomalies in the ground, while the Vehicle Optics Sensor System supported the route surveillance with a camera system on a telescoping mast that

could be used in a variety of environments and while on-the-move. Both systems are in use today.

Working on those projects and seeing how the Army could respond to urgent requirements with systems that were developed through nontraditional research-and-development production schedules set the stage for how Hodges has approached contracting ever since. “I saw how successful it was early on, and then I was able to apply those lessons to the more traditional acquisition approaches for the programs of record that I supported in the future.”

The experience also motivated Hodges to raise her hand when the Army asked for volunteers for the Army Futures Command (AFC) Task Force to help set up contracting at AFC headquarters and the entire command. “For that position, I really got to use all of that experience in working with the labs, working with research-and-development, but also figuring out how to do that expeditiously and

to fit that into how the Army Contracting Command was going to set up to support the AFC,” Hodges explained.

“In the positions I’ve had in the past, I’ve seen the bureaucracy that gets in the way when engineers try to hand over new systems to program managers for the next stage of development, as well as the paperwork that’s involved in all of that and the frustration that occurs when the requirement doesn’t match with the product. I was interested in figuring out what role contracting could play to address all of that—how to best combine user feedback, research and development, program management and contracting to quickly field better products for Soldiers.”

Most memorable about the eight-month task force assignment “is how the culture enabled a small group of personnel to quickly come together, build trust within the group and with external organizations to implement a significant reorganization within the Army in weeks and months,” she said. “The Army needs to harness the cultural aspect across the board to meet the demands of multidomain operations.”

She added, “What’s hard, and why we are professionals, is because we are expected to provide the advice to do the right thing, in the right circumstance, at the right time. It’s much harder to do the right thing, to make sure the contract is established in the right way, or that we approach the acquisition strategy in a way that’s not necessarily ‘hitting the easy button,’ but you know the result is going to be better in the long term. I’ve always been encouraged to do the right thing and not hit the easy button. ... A short-term success may not be what’s best in the long term for the Soldier.”

—SUSAN L. FOLLETT





### A PIVOTAL SPACE

As deployed Soldiers need the battlefield network to do more, be faster and support more applications, PM Tactical Network is working to find solutions that take advantage of pivotal technologies, including those that enable larger numbers of smaller satellites to orbit closer to Earth. (Photo courtesy of the International Space Station)



# MODERNIZING THE NETWORK



**Col. Greg Coile**

A departing network PM discusses challenges and must-haves as the Army moves toward its one network vision.

*by Amy Walker*

**C**ol. Greg Coile has been serving as the project manager (PM) for Tactical Network, assigned to the Program Office for Command, Control and Communications – Tactical (PEO C3T), for the last four years. His program office provides the Army’s tactical network, supporting commanders’ on-the-move mission command requirements from battalion to corps and their forward units on the battlefield. This line-of-sight and beyond-line-of-sight tactical network transport equipment enables global mission command and the exchange of data, voice and video from any location. In this Q&A, conducted before his change of charter in July 2019, Coile provides lessons learned in data sharing, network acquisition and the future of the Army’s tactical network.

**Amy Walker:** The first month you took office, in July 2015, you set out to implement a “One Network” mission and vision. Can you tell us more about the significance of that?

**Coile:** In the past, individual Army programs were singularly focused on their specific requirements, and due to a high operations tempo, network integration fell behind. The Army was delivering capability as quickly as possible to support evolving counterinsurgency operations during the war in Iraq and Afghanistan, and it was forced to complete total network integration later in the process. Now that we face a potential threat by a peer and near-peer adversary, network modernization efforts demand unification.

We can’t afford to look at the tactical network as my radio or your satellite terminal; we have to look at it as “our one network.” This one-network vision calls for organizations and stakeholders within PM Tactical Network, PEO C3T and the Army to view network modernization efforts through the same lens. It calls for them to work seamlessly and cohesively, blurring the lines of organizational boundaries to deliver innovative integrated capabilities more efficiently and effectively. No matter what organization you are assigned to, we are all working toward a common goal—a single, unified network that



rapidly transports the critical data needed to increase lethality and win future wars.

We must view the entire network from the top and then optimize at the individual program levels to ensure integration and cohesiveness. Together we are working toward a common design and standards for our network transport layer to ensure that the development and acquisition of new technologies is integrated and unified.

One of the biggest challenges for the Army is its sheer size. It takes time to field capability across all three components—active Army, Army Reserve and the Army National Guard. So we have to be forward-thinking and look at future technologies years ahead of their availability, and ensure that we are collectively making wise decisions early on, so we don't waste

time and funding. As we start to lay the track for future trains not yet built, the one-network vision becomes even more critical.

**Walker:** What are some of those new technologies you will be looking at in the next five years?

**Coile:** With the ever-increasing demand for bandwidth and application performance, our focus for the near future is to find the best solutions that take advantage of pivotal game-changing technologies, such as the low-Earth orbit (LEO) and medium-Earth orbit (MEO) satellite constellations, and integrating those capabilities into the tactical network of the future. LEO and MEO solutions will be a huge leap forward. There are some initial commercial MEO satellites already

**No matter what organization you are assigned to, we are all working toward a common goal—a single, unified network.**

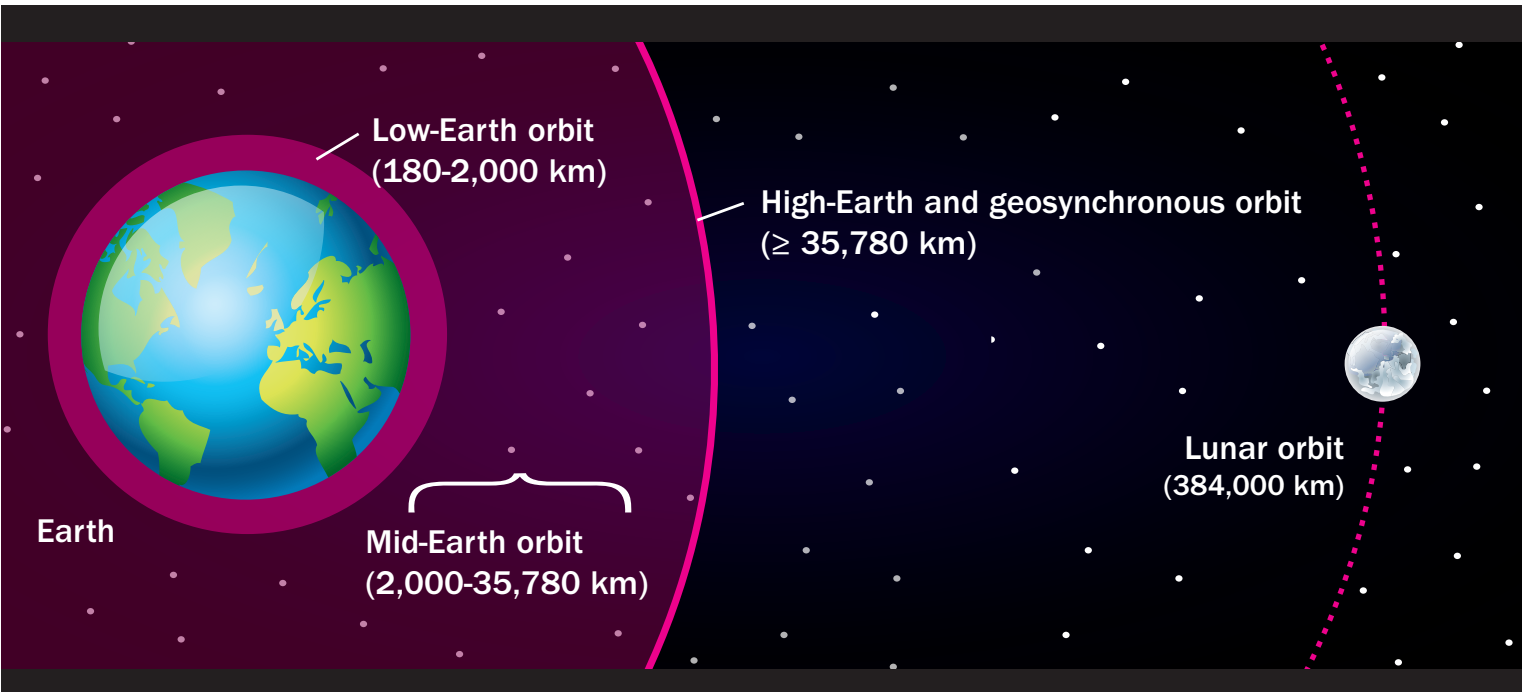
in use today. A few initial LEO satellites and prototypes have been launched, but that is expected to significantly increase as this technology continues to improve and more customers develop the ability to leverage it.

Compared to larger traditional geosynchronous satellites that most people are familiar with, these smaller LEO and MEO satellites travel closer to Earth and are launched in greater numbers. Each MEO constellation can contain more than a dozen MEO satellites, and LEO constellations could have more than 100 of the even smaller LEO satellites orbiting the globe. The natural resiliency that comes with having many satellites is important for the Army for transport diversity in a contested environment and helps improve the on-the-move capability of satellite communications. However, the most important benefits we anticipate will be the significant increase in bandwidth and the lower latency. The signals don't have to travel as far to get to the satellite, so there is more radiated power available



### PLENTY OF BANDWIDTH

These Transportable Tactical Command Communications terminals are one example of the many Army systems that rely on satellites to let Soldiers communicate and connect to the internet in remote locations. (U.S. Army photo by Amy Walker, PM Tactical Network/PEO C3T Public Affairs)



### LOW, MEDIUM AND HIGH

The Army is looking to increase the bandwidth available for satellite-enabled communications by using low- and medium-Earth orbit satellites as the technology to build them solidifies. Most satellites nowadays are geosynchronous and orbit high above the earth, about one-tenth of the way to the moon. Low-Earth orbit starts just above the Earth's atmosphere. (NASA illustration by Robert Simmon)

for communication. The reduced signal-transfer time will significantly improve the performance of the entire network, especially the application layer. These LEO and MEO constellations could also enable us to provide a huge increase in bandwidth compared to current network capability.

These solutions could also enable the Army to put more complex network functions and mission support capabilities in safe sanctuaries, pulling complexity out of the brigade and putting it in locations where it can be effectively maintained with more continuity. Additionally, the ground antennas will be much smaller, which increases unit deployability and mobility on the battlefield.

Our low- and medium-Earth orbit efforts are a perfect example of how the one-network vision comes into play. As an Army, we will have to look at the network holistically. We can't continue to have five or six programs delivering their own various ground satellite terminals. The Army needs to make smart, overarching decisions early on and take advantage of economic quantities

of scale in buying bandwidth on a low- or medium-Earth orbit constellation, supporting the force with one group of constellations as the primary and then alternates after that. If the Army makes some good business decisions with whatever constellations they buy, units wouldn't have to request satellite time for a specific time; it would be available 24/7, just like your cellular network.

The Army is looking to take advantage of this technology in roughly the 2025-2027 timeframe, with initial prototyping projected for 2023. PM Tactical Network plans to conduct initial lab experiments and demonstrations this summer with new commercial off-the-shelf antennas.

**Walker:** What lessons have you learned in addressing current Army requirements?

**Coile:** As our adversaries change, operational concepts have to change, which drives requirement evolution. The enemy is always going to get a vote, so we have to maintain program agility



and be able to adapt to changing requirements. That is one of the biggest lessons I've learned during my tenure as PM.

Our goal is to start off with a broader requirements scope and leverage laboratory and Soldier experimentation and feedback to narrow those requirements to inform full-fielding decisions. For example, the Army is piloting a new organizational design called the Expeditionary Signal Battalion – Enhanced (ESB-E) prototype, providing the 50th Expeditionary Signal Battalion (ESB) with varying options of tactical network equipment that are tailorable, scalable and more agile and expeditionary.

The major concept was not initially based on materiel, but on a change in the organizational structure and how the unit operates. PM Tactical Network, as the materiel provider, laid out equipment that could potentially support that broader concept. Where we previously had a standard-size satellite capability across the board, we now have a toolbox of equipment that allows units to tailor which communications equipment they will use based on particular missions.

The 50th ESB's three companies returned their legacy at-the-halt tactical network transport equipment and will operate different sets of more expeditionary tactical network equipment, including small, medium and large satellite dishes and network baseband equipment packages, so the Army can determine the right characteristics needed to meet future ESB equipment requirements. We are using feedback directly from the units to shape future equipment solutions and force structure for all of the Army's 24 expeditionary signal battalions.

Working with that one-network vision and teaming with the Army's Network



### TACTICAL CONNECTIVITY

The 50th Expeditionary Signal Battalion – Enhanced used its new agile and mobile prototype tactical network equipment package to provide tactical network connectivity to the 1st Theater Sustainment Command during a training exercise in February at Fort Campbell, Kentucky. (U.S. Army photo by Master Sgt. Jonathan Wiley, 1st Theater Sustainment Command Public Affairs)

Cross-Functional Team, in just over eight months, we went from concept approval to fielding the first company and achieved the initial operating capability in early November 2018. We completed fielding to the remaining two companies a few months after that—a year in total from original concept to fielding completion. It's all about agility, a different way for those expeditionary signal battalions to provide communications support. They can tailor their equipment to the mission, using communications equipment that

is also scalable; so as initial, early-entry missions grow and the envelope unfolds, they can just add more components to support a larger set of users.

We took those concepts from the ESB-E and applied them across the board within our Integrated Tactical Network and security force assistance brigade efforts. In a similar way, we are also fielding innovative and evolving expeditionary tactical network and radio communication equipment packages to security force

assistance brigades, which currently provide advise-and-assist support to Afghan security forces.

**Walker:** What types of requirements is the Army going after?

**Coile:** Being expeditionary, or rapidly deployable, has always been at the forefront, along with being more mobile on the battlefield once boots hit the ground. But as we look at potential near-peer threats, we also have to focus on signal path diversity [different network transport options], providing multiple line-of-sight and beyond-line-of-sight signal paths to increase operational flexibility and resilience from an electronic warfare and cyber perspective. We are also continuing to make equipment simpler to operate with a common look and feel, and reliable from a maintenance perspective. New expeditionary tactical network transport, like the inflatable Transportable Tactical Command Communications satellite terminals, can be operational in less than 30 minutes, giving units added operational flexibility and enabling them to sustain their own systems.

We also reduced system complexity and increased reliability of many of our

legacy core on-the-move vehicle integrations, while reducing the size, weight and power to make them more expeditionary. These enhancements include the modernized Tactical Communication Node – Lite and Network Operations and Security Center – Lite and the Next Generation Point of Presence and Soldier Network Extension. These configuration items are now integrated on Humvees versus much larger tactical vehicles, so they can be easily air-transported.

Again, we are looking at things with a broader perspective and trying to expand and integrate capabilities across the board. Upcoming network operations tools will encompass more of our tactical network design so that signal officers can monitor, manage and defend the whole network at once, while providing the flexibility to tailor the network to mission, task and purpose.

**Walker:** You talked about program agility and the ability to adapt to changing requirements as a lesson learned. What other lessons have you learned during your service as PM for Tactical Network?

**Coile:** Another significant lesson learned is stakeholder management, keeping the

Army informed about upcoming decision points. We always have the best and most efficient outcomes when we actively align with stakeholders and actively bring forward recommendations for the Army to make decisions. PM Tactical Network continually pushes and drives information updates on current and future efforts, leveraging forums like the Mission Command Council of Colonels and Mission Command General Officers Steering Committee.

I've found, in the past, that we don't do as well during periods when we have fallen off this track and are executing our own missions without constantly providing feedback to the Army. When we all understand impacts and what hard decisions need to be made, they can be made efficiently and effectively without any surprises on either end. Again, it's all about delivering our one network and working together across the Army as an informed, unified team.

*For more information, go to the PEO C3T website at <http://peoc3t.army.mil/c3t/> or contact the PEO C3T Public Affairs Office at 443-395-6489 or [usarmy.APG.peo-c3t.mbx.pao-peoc3t@mail.mil](mailto:usarmy.APG.peo-c3t.mbx.pao-peoc3t@mail.mil).*

**If the Army makes some good business decisions with whatever constellations they buy, units wouldn't have to request satellite time for a specific time; it would be available 24/7, just like your cellular network.**

*AMY WALKER has been the public affairs lead at PM Tactical Network for the last 10 years, and was the public affairs lead at PEO C3T for the previous two. She has covered a majority of the Army's major tactical network transport modernization effort, including Army, joint and coalition fielding and training events worldwide. She holds a B.A. in psychology, with emphasis in marketing and English, from the College of New Jersey.*






### PUTTING PROTOTYPES TO WORK

Combat engineers emplace Spider Activated Volcano Obstacle prototypes at the Focused Assessment, held Dec. 3-14 at Fort Leonard Wood, Missouri. (Photo courtesy of New Equipment Training and Media Production, Picatinny Arsenal)






# THE SHAPE OF THINGS TO COME



Three events are critical in developing the concept of operations for terrain-shaping obstacles.

*by Lt. Col. Phillip Poteet*



New capabilities are seldom new. Most have the benefit of experience, defining the overall shape and expectations of a system (e.g., increased range, payload or precision; manned to unmanned operation; or improved resource efficiency). These benefit from having been done before, such as a new tank having the overall shape of the tanks before it. Then there are the opportunities for revolutionary improvements: the integration of technologies in a way that has not been done before, making it “new” to the Army in terms of design decisions and requirement trades, the employment of tactics, techniques and procedures, and training tasks. The doctrine for how we fight is still valid, but it now has new technologies within it.

Writing solid, informed requirements for these revolutionary capabilities that do not currently exist is the precise challenge for the next generation of terrain-shaping obstacles. Shaping the battlefield and thus shaping the terrain has been doctrine for how we plan and execute large-scale ground operations. This can be done by integrating multiple resources such as air power, artillery and obstacles. We want friendly forces to have freedom of maneuver while limiting the enemy’s ability to maneuver against us. Obstacles make all this happen.



Obstacles can be ditches, wire, natural restrictive terrain and, in this case, lethal munitions. Terrain-shaping obstacles specifically are lethal munitions that as an economy of force can easily equal 25 percent of a maneuver force's capability. Terrain-shaping obstacles were previously represented by traditional row land mines, but those have left the Army inventory because of policy restrictions. So a completely new, revolutionary munition is needed.

Developing the concept of operations for terrain-shaping obstacles is the challenge that today's Army faces. The end state is to achieve or exceed the same battlefield effects and provide the warfighter the means to achieve those effects.

Traditionally, developing a concept of operations requires an examination of capabilities required to solve the current problem and identifying what's within the realm of possibilities, such as linking remote sensors to shooter systems; mine-fields that "self-heal" by repositioning or re-orienting to close gaps in coverage; autonomous munitions; and human-in-the-loop munitions. Stakeholder

**"Normally, industry meetings with government program offices are one-way communications from the government to industry with a few questions from the audience. This forum was open and free-flowing."**

input from the warfighter, industry and the Army science-and-technology and research-and-development communities provides the foundation for informing requirements.

Providing information requirements early in the process as programs develop new technology and solutions is the key to ensuring that we are developing the right technical solutions for the future. It is vital to engage specific stakeholders early in the process of the requirements document development, to drive candid, open discussions about options, concepts and operational scenarios.

If necessity is the mother of invention, then involving all Soldiers—from those

fresh out of the schoolhouse to seasoned combat veterans—at the earliest opportunity is the first step to getting the requirements right and developing a concept of operations for the next generation of terrain-shaping obstacles. Once we understand the intent for their use in the larger picture, then we can begin to understand what needs to be developed.

But collecting meaningful Soldier feedback (from user jury events, Soldier touch points, etc.) in a timely manner is also a challenge. It is one the Army has tried to address with experimentation and rapid prototyping, but these events are difficult to get approved, resource-intensive to execute, and difficult to use as a way to inform requirements until many decisions



#### ENGINEER BRIEFING

The author, left, gives engineer Soldiers an overview during the Close Terrain Shaping Obstacles Seminar Wargame at the U.S. Army Engineer School at Fort Leonard Wood, Missouri. Candid feedback and questions were strongly desired. (Photo by Stephen McFarlane, Product Manager TSO)

have been made because of the staffing and approval process to find units and Soldiers with time to share. This is where networking, relationships, stakeholder management and simply asking come in. In this approach, engaging a local unit may result in borrowing a few Soldiers for a day to get immediate and enlightening feedback.

The Product Manager for Terrain Shaping Obstacles (TSO), formerly the Product Manager for Gator Landmine Replacement, within the Project Manager for Close Combat Systems (PM CCS) under the Joint Program Executive Office for Armaments and Ammunition (JPEO A&A), is currently developing the revolutionary next generation of terrain-shaping munitions. The concept is a box that includes either top attack or bottom attack munitions (the latter detonates as the threat rolls over it, and the former launches in the air and attacks from above when the threat is most vulnerable). Each box will contain a series of targeting sensors as well as networked two-way command-and-control. The munitions will feature on-off-on, remote destruct, self-locate and self-reporting capabilities, and can remain in the box and be recovered and reused if they're not dispensed.

Product Manager TSO has facilitated several events to better inform the concept of operations, requirements and sustainment for the next generation of terrain-shaping obstacles. These events include:

**Command and control conference.** At this May 2018 conference, we openly discussed the command, control and communication solutions (and combinations thereof) that currently exist or are being developed for possible inclusion into the program. We asked our industry partners to share their thoughts on their own



### DEPLOYING THE OBSTACLES

A look at the way terrain-shaping obstacles eventually will be deployed. The piece that PM CCS is currently working on is the close range. Bottom attack munitions detonate as the threat rolls over them, but they are vulnerable to mine-clearing vehicles and detectors; top attack munitions, which launch when deployed and attack from above, where the threat is most vulnerable. This is PM CCS's current emphasis. The Army also envisions mid deployment using artillery, and mid and close deployment using vehicles and aircraft. Finally, the Air Force will be delivering deep TSO. (Graphic by PM CCS)

proposed solutions without necessarily disclosing proprietary data.

The government support team created 12 questions to help meeting facilitators spur conversation. These questions encompassed major focus areas of safety, such as safe passage for friendlies; data security and encryption; long- and short-haul communication capabilities; acquisition; and supportability. The questions were asked several times to encourage industry

partners looking at command-and-control systems for terrain-shaping obstacles to share more insight into their solutions.

Government and industry participants presented more than eight hours of briefing material to the audience during the daylong forum, including technical details of the various industry approaches that were investigated and a discussion of the various trade-offs of each approach.



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## Involving all Soldiers—from those fresh out of the schoolhouse to seasoned combat veterans—at the earliest opportunity is the first step to getting the requirements right.

the options for the communication suites offered by our industry partners, and help us mature the requirements.

This technical interchange meeting enabled industry partners, Product Manager TSO and representatives from Product Manager Mission Command to openly exchange critical information on the best technical approaches used in the past, present efforts, emerging technical advances and best practices. Industry partners asked questions about different approaches and responded to questions about their respective design solutions. This engagement was leveraged as a forum to debate the scale of data needed for remote obstacle management and the level of data encryption needed. This benefited all participants by opening the aperture of all prior assumptions and biases, reducing the final scale of the effort to a more manageable approach while not releasing proprietary components of industry programs.

While each industry partner had a plan to demonstrate a future system using a

prototype communication solution, key to this forum was a means for early maturation of a scalable device that could be integrated by anyone. This investment in a common satellite modem was a risk solution intended to provide industry partners either a backup plan or a solution for their program.

The effort leverages previous investments made by the Army, the U.S. Department of Energy, the Project Manager for Position, Navigation and Timing, the Combating Terrorism Technology Support Office and U.S. Special Operations Command to reduce cost and schedule burdens for the terrain-shaping obstacles. Another benefit to this engagement is that the open architecture in the module will be easily updated for the next generations of communication waveforms.

### CONCLUSION

The open discussion among developers, stakeholders and Soldiers helped further refine the final design and focus the direction the government is pursuing for the development of terrain-shaping obstacles, from munitions to controllers to a common communications solution. The frequent and early engagement of Soldiers was also a critical piece of design and requirements refinement. After all, they only truly see things from their point of view, and that is what we are trying to build.

The requirements authors were pleased with the open discussion that took place in the forums. “These events helped the capability developer refine requirements just from an information sharing and situational awareness of perspectives and points of view,” said John Hegle, chief of the Requirements Division of the Maneuver Support Capabilities Development and Integration Directorate. “We heard from vendors, engineering support staff,

program managers, Soldiers and other stakeholders that have ideas to help in establishing a successful path forward. Acquisition done right is always a team sport where you seek to find a balance, an optimal solution set, for addressing identified capability gaps. We discovered it should be done sooner than we first planned to better support multidomain operations.”

A similar sentiment was expressed by an industry partner. “I found the industry exchange unusually refreshing,” said Robert Bills, president of NAL Research Corp. “Normally, industry meetings with government program offices are one-way communications from the government to industry with a few questions from the audience. This forum was open and free-flowing, two-way communications with honest dialogue and debate that was used to support the program manager’s decision on a future communications approach for the CTSO [close terrain-shaping obstacles] program.”

When developing concepts of operation, early candid dialogue and Soldier involvement are the keys to informing requirements, regardless of what type of program you have. There is no limit to what these engagements will uncover, clarify and inform.

*For more information, go to the Project Manager Close Combat Systems website at <https://www.pica.army.mil/pmccsl>.*

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### **NEW MUNITIONS NEEDED**

The Army is phasing out the cannon-delivered cluster munitions it has used until recently because they are not effective against armored targets, and the “dud rate” is higher than DOD guidance now allows. The dud rate is the percentage of submunitions that don’t explode on contact and remain on the ground as unexploded ordnance, threatening civilians and Soldiers. (U.S. Army photo)

# BRIDGING THE GAP

C-DAEM program maximizes industry innovation to expedite capability to the warfighter.

*by Lt. Col. Thomas D. Jagielski and James A. Sarruda*

**E**volving threats, complex requirements and a wary industrial base can delay capabilities from reaching the field to support the warfighter. For the 155 mm Cannon Delivered Area Effects Munition (C-DAEM), the Joint Program Executive Office for Armaments and Ammunition (JPEO A&A) developed an incremental acquisition approach to deliver anti-armor and antipersonnel munitions from 155 mm systems to achieve overmatch against adversaries.

The acquisition strategy for C-DAEM communicates performance objectives and identifies trade space that incentivizes industry to invest, allows flexibility to leverage the newest technologies, and incorporates a modernization strategy that emphasizes open systems architecture and preplanned product improvement. The C-DAEM requirements development and evolution process limits constraints that gradually become outdated and restrict innovation. This unique approach to requirements development removes barriers and enables faster development of lethal capabilities to engage moved or moving targets at extended ranges, and ultimately the ability to differentiate between friendly and hostile vehicles.

Cost and schedule concerns have plagued acquisition for decades. JPEO A&A is implementing an innovative strategy to replace the Army's 155 mm delivered Dual-Purpose Improved Conventional Munitions (DPICM) that addresses both issues. DPICM, an artillery cannon-delivered cluster munition that delivers area effects, has served the Army well for many years as a means to compensate for imprecise target location, but it is not suitable for defeating advanced armored threats and does not meet requirements set forth by the Office of the Secretary of Defense (OSD) on cluster munitions. The JPEO A&A objective is to deliver the next generation of lethal effects capability to the warfighter, and to deliver it quickly.



## ENTER THE C-DAEM PROGRAM

OSD has directed a phase-out of cluster munitions with dud rates greater than 1 percent, meaning more than 1 percent of their submunitions fail to function, leaving unexploded ordnance that is a threat to military forces and innocent civilians alike. Industry partners responded by quickly creating alternatives to address immediate requirements while maintaining a modular design to support the Army's modernization plan. As a result, C-DAEM became one piece of the Army's modernization triad of propellant, projectile and cannon to increase range and lethality of artillery systems.

The modernization plan requires the projectile to be compatible with more than just the current 39-caliber systems like the M109A6/7 Paladin. JPEO A&A plans for C-DAEM to enhance the Army's next-generation 58-caliber long-range cannon system. In fact, JPEO A&A streamlined the acquisition process for C-DAEM to synchronize with the future weapon system. Until then, JPEO A&A will reward innovation by developing a bridging strategy to help smooth the transition to the program of record.

With a two-projectile solution, the C-DAEM program addresses both the armor defeat and anti-personnel mission sets served by cluster munitions. The Army

has prioritized armor defeat as a key capability that requires immediate attention, and it is being addressed through a bridging strategy until a more effective solution is developed.

## THE BRIDGING STRATEGY

Donald Rumsfeld correctly stated that "you go to war with the Army you have, not the Army you might want or wish to have at a later time." JPEO A&A, understanding this lesson from the Iraq War and acknowledging that even the most efficient path to an initial operating capability of the Army's cluster munition replacements would require time to develop, considered multiple anti-armor capabilities and determined that the Bonus munition from Sweden provided the most timely and effective solution. The purchase of these projectiles as a commercial off-the-shelf item is the C-DAEM bridging strategy to fill the current need until a more effective solution is available.

Buying commercial off-the-shelf items using the NATO Support and Procurement Agency allows the Army to take advantage of a known legacy solution that has established performance and few uncertainties. The Bonus projectile, produced by BAE Systems Bofors and Nexter, is a sensor-fused munition. Unlike conventional cluster munitions, the Bonus projectile releases two submunitions, each containing its own sensor to detect targets. Its ability to detect targets improves lethality while reducing collateral damage. Redundant self-destruction modes, including target engagement, point detonation, time out and battery drainage make it compliant with the new OSD directive. These features, along with others, set the minimal standards for C-DAEM follow-on efforts—whatever product the Army develops to replace the Bonus projectile will need to do what Bonus does, and more.



## ARTILLERY IN THE FIELD

The C-DAEM program was looking for a new munition to use in multiple artillery systems, and found a commercial solution that will work well until the Army can develop its own replacement. (U.S. Army photo by Gertrud Zach, Training Support Activity Europe)



### LEAP-AHEAD TECH ON THE WAY

A howitzer round shoots into the air as Soldiers assigned to the 4th Battalion, 319th Airborne Field Artillery Regiment conduct training in Grafenwoehr, Germany, July 25, 2018. (Photo by Army Spc. Josselyn Fuentes)

### INNOVATION INCENTIVES

The C-DAEM goal is to encourage innovation by our industry partners. Rather than constraining creativity by defining an arduous requirement that sets thresholds and objectives, the C-DAEM team developed a hierarchy of objectives that communicates Army priorities and gives industry partners the flexibility to define their own trade space. Instead of working to the threshold value and never getting to an objective in any area, this approach incentivizes increased performance in all areas. This technique also encourages teaming between industry groups that specialize in unique technology areas that complement the development of the C-DAEM solution.

The only limitation placed on industry is that any proposed solution must be ready for a demonstration by the third quarter of FY21. The C-DAEM team will score each contractor's performance

at the demonstration against the objectives hierarchy to determine how well the concept meets the program's priorities. In the end, however, only part of each competitor's total score will derive from performance at the demonstration, as the C-DAEM team will incentivize a systematic approach to the demonstration by giving credit for modeling and simulation efforts that demonstrate a deeper knowledge of the system capability beyond the demonstration prototype.

The system or systems that perform better than the current solution (Bonus) and achieve the best results in the holistic competition will then proceed to urgent materiel release, under the authority of Section 2371b of the National Defense Authorization Act for Fiscal Year 2016, which states that successful prototyping efforts completed under an other transaction agreement may transition to a Federal Acquisition Regulation-based contract. The prototypes will also continue

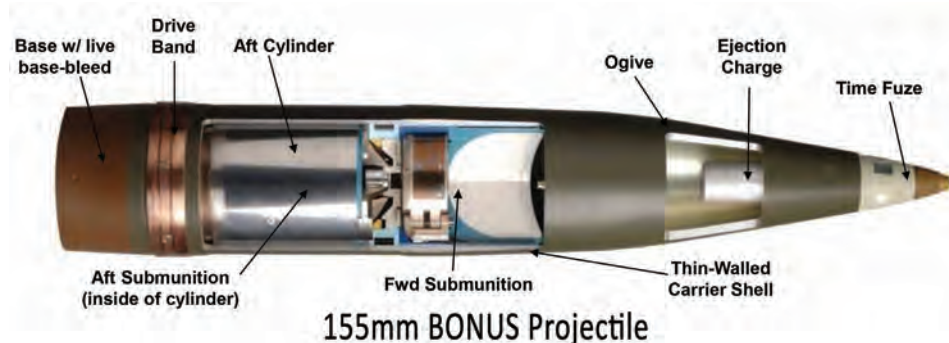
**Army leadership often asks: "What is the average time to award a Federal Acquisition Regulation-based contract?" Government contracting officials immediately respond, "It depends." Industry partners answer more definitively: "Too long."**



on to the engineering and manufacturing development phase, where upgrades described as part of the holistic evaluation will be integrated using a Defense Ordnance Technology Consortium (DOTC) contracting process. A DOTC contract enables the C-DAEM team to accept prudent risk, share communication, engage in transparent relationships and build trust with industry.

Army leadership often asks: “What is the average time to award a Federal Acquisition Regulation-based contract?” Government contracting officials immediately respond, “It depends.” Industry partners answer more definitively: “Too long.” The simultaneous use of multiple contracting alternatives removes bureaucratic delay caused by burdensome regulation. Too often, government agencies limit opportunities because of resistance to change and reluctance to operate outside their comfort zone. Good risk—also known as opportunity—no matter how uncomfortable, is the genesis of process improvement. Brig. Gen. Alfred F. Abramson III, joint

**With a two-projectile solution, the C-DAEM program addresses both the armor defeat and antipersonnel mission sets served by cluster munitions.**



### THE BRIDGE SOLUTION

The Bonus projectile, produced by BAE Systems, improves on the performance of older cluster munitions that are being phased out. (Graphic courtesy of the authors)

program executive officer for Armaments and Ammunition, often reminds acquisition professionals that they should “feel comfortable being uncomfortable” as they work to change the culture of risk aversion in Army acquisition.

### CONCLUSION

The C-DAEM team considered multiple acquisition strategies to expedite leap-ahead technologies to the warfighter. Each program is unique and therefore must determine the optimal solution for its circumstances. There is no single right acquisition strategy.

Frank Kendall, former undersecretary of defense for acquisition, technology and logistics, preferred the term “acquisition improvement” rather than “acquisition reform.” It doesn’t matter what you call it—the one steady state in acquisition is change. Adaptability to change and knowledge of the current state of acquisition regulations equip decision-makers to determine an optimal solution that is legal, ethical and moral.

For more information, go to <https://jpeoaa.army.mil/jpeoaa>.

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# ASK THE RIGHT QUESTIONS

For the Army to successfully develop artificial intelligence, it needs to collect the right data before investing.

*By Lt. Col. Jenny Stacy*

Ongoing advances in artificial intelligence (AI) “will change society and ultimately, the character of war,” according to the 2018 National Defense Strategy. DOD has prioritized AI investments to increase lethality and retain multidomain dominance over peer and near-peer adversaries.

As part of this technology pivot, the Army is laying the foundation to integrate AI into future tactical network modernization efforts. AI technology has matured since the mid-1950s, when development began, but acquisition professionals need to temper unrealistic expectations, be cautious of buying into industry hype, and gain enough understanding of AI to ask the right questions before making an investment.

## **AI IN THE ARMY: WHERE ARE WE NOW?**

“A.I. refers to the ability of machines to perform tasks that normally require human intelligence—for example, recognizing patterns, learning from experience, drawing conclusions, making predictions or taking action—whether digitally or as the smart software behind autonomous physical systems,” according to the 2018 DOD AI Strategy, released in February.

AI applications can quickly analyze vast amounts of data to produce actionable information. They can predict terrorist attacks,

identify targets from imagery or audio surveillance, or enable faster and more informed decisions.

DOD’s AI strategy calls for accelerating delivery and adoption of AI; establishing a common foundation to scale AI’s impact across the department and enable decentralized development and experimentation; evolving partnerships with industry, academia, allies and partners; cultivating a leading AI workforce; and leading in military AI ethics and safety.

In October 2018, the Army established a scalable Army-AI Task Force under U.S. Army Futures Command to narrow existing AI capability gaps by leveraging current technological applications. The AI task force will work closely with the cross-functional teams at work on the Army’s modernization priorities to integrate AI into those efforts. The Army’s Rapid Capabilities and Critical Technologies Office (RCCTO) is already applying AI technology to address signal detection on the battlefield, by inserting AI and machine-learning prototypes into electronic warfare systems. These prototypes will be fielded to select operational units as early as August.

## **RECENT AI FAILURES**

AI technology has existed since the 1950s. In 1970, cognitive scientist Marvin Minsky predicted “a machine with the general





#### PAINTING A PICTURE WITH AI

The electronic warfare team from 3rd Armored Brigade Combat Team, 1st Cavalry Division (3/1 CAV), along with members of the Rapid Equipping Force, prepare the Electronic Warfare Tactical Vehicle for operation in January at the National Training Center at Fort Irwin, California. RCCTO is seeking new technologies that apply AI and machine learning to paint a picture of the electromagnetic spectrum. (U.S. Army photo by Capt. Scott Kuhn, 3/1 CAV)

intelligence of an average human being” would manifest within 10 years. The field has cycled through similar peaks of optimism that give way to failure since then—and has yet to produce a machine that can achieve the heights that Minsky predicted. Though recent advances in computer processors and sensors have enabled a leap in maturity, the technology is not fully mature. Computers still have difficulty classifying objects that are not the norm, and unintended errors can cause mistakes as well. It is not possible to predict all corner cases (situations outside of normal operating parameters), and misclassification of data can lead to fatal errors.

In March 2018, an Uber experimental autonomous vehicle operating in Tempe, Arizona, struck and killed a woman who was walking her bicycle outside of a crosswalk in a poorly illuminated area. The vehicle’s sensors detected an object six seconds before the crash and determined an emergency braking maneuver was necessary; it did not engage the brakes. The National

Transportation Safety Board report on the incident, published in May 2018, noted: “According to Uber, emergency braking maneuvers are not enabled while the vehicle is under computer control, to reduce the potential for erratic vehicle behavior. The vehicle operator is relied on to intervene and take action. The system is not designed to alert the operator.”

In 2017, National Science Foundation researchers built an algorithm to determine what changes to an object would confuse an AI classification program (like a driverless car program of the kind Uber was testing in Arizona). The algorithm generated two different attacks: a stop sign with graffiti on it and a stop sign with stickers strategically placed on it. (See Figure 1.) In both cases, the AI program misclassified the stop sign as a 45 mph speed limit sign. “Adversarial attacks” with subtly altered images, sounds or objects that normally would not fool humans are able to fool AI programs.

## MACHINE LEARNING 101

There are many different applications of AI, including machine learning, a subspecialty of AI that uses probability and statistics to train computer programs. The computer “learning” is usually performed offline using a training dataset to build a mathematical model to reflect the real world. The closer the model reflects reality, the more accurate the computer predictions. Once the program is fielded, it can continue to “learn” to improve its effectiveness.

### EXAMPLE: SPAM VS. HAM

Early spam email filters were not very effective at identifying spam. Programs used “if-then” rules to identify spam. For instance, if a word like “Viagra” appeared in an email, then the email was automatically labeled as spam. Employees at those companies continually updated their word lists to adapt, while spammers only needed to slightly modify words in an email to create new scams and get around spam filters.

Machine learning automates that process by building a statistical model of spam email to classify emails as spam versus “ham” (good email). Companies gathered a large dataset of spam and ham emails. Using probabilistic and statistics algorithms in combination with spam and ham emails, the computer “learned” the probability of an email being either spam or ham. The machine could then automatically classify new emails based on the probability of being spam or ham, given the words in the email.

### FACTORS FOR EFFECTIVE MACHINE LEARNING

It’s all about the model and the data used to build it. The more data used to train the model, the better it can reflect the world that is being modeled. The data, however, must be good data. Erroneous input, whether accidental or deliberate, will skew

FIGURE 1



### TROUBLE AT-THE-HALT

No human being would mistake either of these altered signs for anything but stop signs. National Science Foundation researchers, using an algorithm to defeat AI driving systems, found the systems mistook both for 45 mph limit signs. (Photo courtesy of Cornell University)

the model. Data also must be tagged or labeled with descriptions to train and test algorithms (e.g., emails classified as spam or ham, or pictures tagged as “helicopter”). Without tags, the data is less useful and informative than it could be—a computer learns more from a picture of a helicopter tagged with the word “helicopter” than it does from just the picture without a tag. Depending on the type of data, tagging or classifying it can be a time-intensive, manual process.

Rigorous testing measures how a model performs with a test dataset that does not contain the data used to train the AI model, to give a true representation of the model’s performance. Models tested against training data will have inflated performance scores, as the model has seen the data before and knows how to classify it. Precision, recall and f-scores better judge an algorithm’s performance than the traditional accuracy metric.

Precision measures how many of the predicted items were classified correctly (e.g., how many of the emails labeled as spam were really spam).

Recall measures how many in the total dataset were correctly identified (e.g., did the program find all the spam?). Having high recall is not meaningful if precision is low; conversely, high precision does not necessarily entail high recall.

F-score, the weighted average of precision and recall, overcomes the accuracy paradox because it takes into account false positives and false negatives and balances recall and precision.

Computational power also affects performance quality. The more parameters and the greater the complexity of an algorithm, the more computing power needed. Insufficient processing power prevents a timely and, therefore, useful result.



Programmers use heuristics, “rules of thumb,” to reduce complexity, parameters and processing power needs, or to fill knowledge gaps during algorithm development. These heuristics may trade off optimality, completeness, accuracy or precision. The heuristics could affect the program’s ability to find an optimal solution when multiple solutions exist or prevent it from finding the most correct or optimal solution. They may also only nominally decrease computing time. Poor heuristic choices and underlying assumptions degrade the validity of an algorithm’s output.

In the end, humans determine the underlying assumptions used to design AI programs. The result presented to consumers is often a black box containing a mix of clever programming and smartly analyzed data. But if created poorly, models can be too sensitive or not sensitive enough, resulting in too many false positives or false negatives. Corner cases, human insertion of errors and inaccurate models from bad or limited datasets will also lead to errors. Data requirements, accurate modeling, processing power and fallibility also apply to other AI specialties, such as facial and voice recognition.

### ASK THE RIGHT QUESTIONS, GET THE RIGHT TECHNOLOGY

DOD is investing heavily in AI to gain military advantages and reduce workload. A working knowledge of AI will help product managers better understand industry presentations, and will help assess technical maturity and determine viability and scalability of a solution during the market research phase.

Preliminary market research questions include:

- How is the model built? What are the underlying assumptions?
- How is the model tested? Was training data used in the test set?
- How well does the model reflect the real world? What are the performance results of testing? How much better than random chance? What are the precision, recall and f-scores (closer to 100 percent is better) and confidence level in the results? What is the rate of false positives and negatives?
- How was the dataset gathered? If data was gathered from people, did the people know it was being gathered? How big are the training and test datasets? If the dataset isn’t built yet, how long will it take and how much will it cost to build?
- How well does the program perform against deception and adversarial inputs (e.g., a subject wearing sunglasses or a hat)? What happens when the program is presented with corner cases?
- How much computing power is required? Where does the processing occur? How long does it take for results to be computed?

- Can the algorithm be updated easily? How are improvements inserted? How is real-time performance measured? Can operators determine when the algorithm is performing poorly in real time?
- How well does the program work with existing programs to input and export insights?
- Is the system autonomous or human-assisted? How much human assistance does it require?
- Where are decisions made? Are they made by humans, or does the program automatically do it? This is a critical question for decisions about the use of force.
- What rights does the government have to the dataset and the trained model?

### CONCLUSION

Increases in processing power have enabled greater advances in AI to solve complex problems on and off the battlefield. There are still limits to what AI can do, however. We can be cautiously optimistic but must exercise prudence and rigor to ensure that we can identify the difference between a viable solution and a black box filled with empty promises. Asking the right questions up front will help unveil technology readiness—and help DOD steer clear of vendor oversell—enabling the right acquisition decisions and the efficient spending of Army resources.

*For more information, go to the Program Executive Office for Command, Control and Communications –Tactical (PEO C3T) website at <http://peoc3t.army.mil/c3t/>, or contact the PEO C3T Public Affairs Office at 443-395-6489 or [usarmy.APG.peo-c3t.mbx.pao-peoc3t@mail.mil](mailto:usarmy.APG.peo-c3t.mbx.pao-peoc3t@mail.mil).*

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# TIGHTENING THE SUPPLY CHAIN

USASAC working group develops initiatives to make sure foreign military sales don't affect U.S. Army readiness.

*by Debra Valine*

**W**hen Gen. Gustave F. Perna, commanding general of U.S. Army Materiel Command (AMC), visited U.S. Army Security Assistance Command (USASAC) March 18, he emphasized that foreign military sales should not negatively impact the Army's supply chain.

The meeting at USASAC's headquarters at Redstone Arsenal, Alabama, continued an AMC effort—formally known as the Demand-Planning Integrated Planning Team—to improve the way AMC plans for and executes surges in sustainment support for training or major deployments. Although foreign military sales usually aren't part of these exercises, any unanticipated foreign military sales demands could stress the logistics support process.

As a result of this meeting, Perna tasked USASAC, a subordinate command of AMC, with finding ways to avoid impacts to Army readiness from foreign military sales requirements.

"USASAC found instances where foreign military sales demands may have been filled more on a first-in, first-out basis instead of accurately following the existing Army regulatory guidance," said John Neil, director of the Performance and Process Management Office at USASAC's site in New Cumberland, Pennsylvania. "We can help Army prepare for FMS [foreign military sales] cases without impacting the supply chain."

The goal is to provide maximum flexibility to the item managers at each of the life cycle management commands to appropriately plan, acquire and fill foreign military sales demands, without affecting Army readiness. (The item manager is the person within





### FLEET MANAGEMENT

UH-60 Black Hawk and AH-1 Cobra helicopters are refurbished in this maintenance facility in Huntsville, Alabama, owned by SES Inc., under a foreign military sales contract. Eight new initiatives will provide life cycle management commands a framework for meeting demands under those contracts without affecting Army readiness. (U.S. Army photo by Richard Bumgardner, USASAC Public Affairs)

each DOD service who manages all aspects of the materiel that is assigned to them.)

A USASAC working group, led by Neil, developed eight initiatives that will achieve Perna's goal. The working group includes supply source management personnel from the security assistance management directorates, the life cycle management commands and the Defense Logistics Agency.

### EIGHT INITIATIVES

**Initiative 1** encourages FMS customers to use the Cooperative Logistics Supply Support Arrangement Program. This program

is an agreement between a military department and a purchaser that sets forth the terms and conditions under which DOD will supply spares for common weapon systems on an equal basis with U.S. forces.

**Initiative 2** developed a dashboard that allows life cycle management commands to analyze current and past demand to facilitate corrective actions and interventions. The dashboard compares Army supply availability and readiness drivers (identified by National Item Identification Numbers, or NIINs) provided by AMC to past foreign military sales shipments and current open requisitions. Readiness drivers are those items that are in short

supply but critical to the operation of a weapon system—rotor blades for a helicopter, for example. A NIIN is a nine-digit code that identifies each item.

“The dashboard will be used by Army demand planners to review the historic release of FMS requirements to determine if they were planned for properly and whether they were released properly,” Neil said. “The purpose is to determine whether the current regulation is being followed for the release of FMS requirements.”

Although both of these initiatives have been completed, Neil said it will take a couple of months of tracking data to see what effect these may have on the foreign military sales customer or the overall readiness posture of the Army.

**Initiatives 3 and 4** establish edits within the Army’s database for foreign military sales, to allow more of the AMC critical materiel demands to be processed against a case that authorizes the materiel item managers to forecast the demands.

“The central case management team will determine if the requisitioning country has a cooperative logistics supply support arrangement case that could be used to requisition the materiel,” Neil said. “If the answer is yes and the country agrees to the change, the team would advise the country to requisition against their logistics support agreement case. This allows the item manager to fill the requisition and also include that demand in the Army’s planning and forecasting process, which should, over time, allow for additional stocks to be on hand to fill future requirements.”

**Initiative 5** establishes a process to assign an Army-coordinated lead time to each requisition for the NIINs defined by AMC to be problematic. This makes it possible for the item manager to acquire sufficient stock to meet the demand over time, rather than taking stock from existing inventory. According to Neil, this will allow the item manager the normal acquisition time to plan for, acquire the stock and fill the requisition without taking stock from on-hand inventory.

Neil said the remaining three initiatives are based on actions that could be taken by AMC leadership to provide weapon system spares to FMS customers.

**Initiative 6** creates a “by exception” process to use alternative sources of supply to support new weapon system sales.

**“USASAC found instances where foreign military sales demands may have been filled more on a first-in, first-out basis instead of accurately following the existing Army regulatory guidance.”**

### ARMY FMS PROCESS

There are six steps in Army foreign military sales:

- Allies and partners submit a letter of request to USASAC for arms, defense equipment, defense services and military training.
- These requests are coordinated with the geographic combatant commands and the U.S. Department of State.
- The case is developed, which includes defining requirements, quantities, delivery, payment schedules, etc.
- A letter of offer and acceptance is submitted to DOD’s Defense Security Cooperation Agency. After it is approved, it is sent to the requesting country.
- In some cases, congressional notification and approval may be required.
- After the U.S. government and the ally or partner sign the letter of offer and acceptance, the ally or partner must provide initial funds for the case to officially begin.

USASAC personnel oversee all cases from cradle to grave.





### OPTIMIZATION INITIATIVES

Staffers from USASAC's New Cumberland, Pennsylvania, offices meet to discuss initiatives to optimize the supply chain for foreign military sales contracts. From left are Lester Straub, senior concept principal analyst, PROJECTXYZ Inc.; Lori Sekela; program analyst, USASAC Performance Management Office; Matthew Siderias; requisitioning/materiel request history and status process manager, USASAC Process Office; and Kathy Heikel; senior concept principal analyst, SIGMATECH Inc. (Photo by Joel Vazquez, USASAC)



### FINE-TUNING

A sheet metal technician works on a patch for a panel for an AH-1 Cobra helicopter at the SES Inc. facility in Huntsville. SES has a foreign military sales contract to refurbish Cobra helicopters for Jordan. USASAC has been looking into ways to mitigate the impact of similar contracts on overall Army readiness, following a request from Gen. Gustave F. Perna, AMC commanding general. (U.S. Army photo by Richard Bumgardner, USASAC Public Affairs)

**Initiative 7** creates a “by exception” process to require the use of Cooperative Logistics Supply Support Arrangement Program cases for sustainment on the sale of some new weapon systems. This will build better demand history for the systems, as it is the only program allowed by U.S. law in which the foreign customer’s requisition history can be used to forecast demand.

**Initiative 8** creates a “by exception” process to require contractor spares for the sale of some systems, to be determined by AMC.

Training is underway for country case manager teams on the new edits and processes for handling the specifics of the eight initiatives.

### CONCLUSION

Foreign military sales may not be a large percentage of the overall spare parts requirements, but they can impact Army readiness nonetheless. The initiatives spelled out above illustrate that the AMC security assistance enterprise is leading the effort across the Army and the Defense Logistics Agency to minimize the impact of foreign military sales on the Army supply chain management process to support U.S. forces, allies and partners.

*For more information, contact John Neil at 717-770-4123 or [john.w.neil4.civ@mail.mil](mailto:john.w.neil4.civ@mail.mil).*

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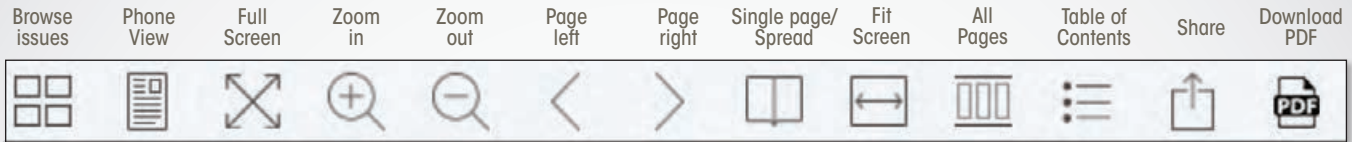
*DEBRA VALINE is a public affairs specialist with PROJECTXYZ Inc., working in the Public Affairs and Command Information Office of USASAC at Redstone Arsenal. Previously, she was the chief of public affairs for the U.S. Army Engineering and Support Center in Huntsville. She holds a B.S. in psychology from the University of Maryland University College.*



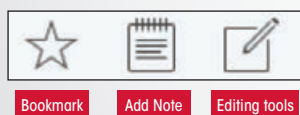
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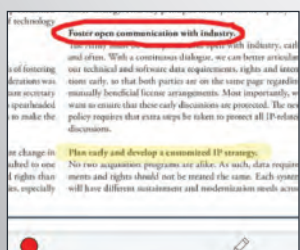
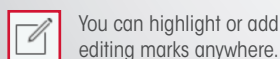
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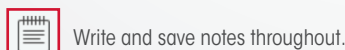
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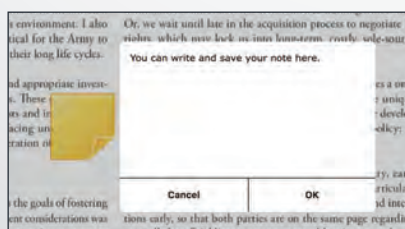
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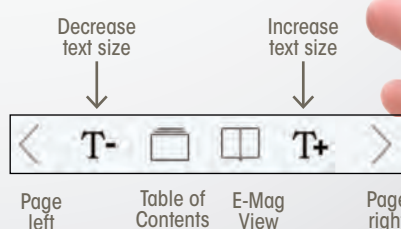


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### LEARNING THE INS AND OUTS

Shai'mel Bell, warehouse specialist, shows Pvt. Jeanneth Martinez and Spc. Lorimay Melendez how to use a training version of the Global Combat Support System – Army. The web-based logistics tracking and transaction system was designed to be used throughout the Army, but training gaps have hindered its effectiveness. (Photo by Terrance Bell, U.S. Army Garrison Fort Lee Public Affairs)



# AUTOMATED INVENTORY CONSTRAINTS

Automatic identification technology improves speed and accuracy of logging ammunition supplies, but Soldiers in forward theaters can't use it.

*by Chief Warrant Officer 3 Michael K. Lima*

One of the advancing capabilities in sustainment operations is that of automatic identification technology (AIT), which can increase the accuracy of inventory records by automating the required data collection and enabling transmission of the data to and from military systems.

The Army has implemented the use of AIT as its inventory control technology of choice. But the equipment sits unused in forward theaters because of outdated policies, network constraints and a lack of training.

The AIT suite encompasses a variety of data storage and carrier technologies such as one-dimensional linear bar codes and two-dimensional (2D) symbols. The AIT suite can be combined with other technologies, such as active radio frequency identification (RFID), and can be used to read the stored data of equipment such as military vehicles and materiel

in intermodal containers. Together, those systems can provide the in-transit visibility that the military requires; commanders will have the critical information they need to track unit cargo and sustainment materiel through the supply chain, from production to forward storage areas.

An example of how AIT works in our everyday life: Order a package at Amazon.com, and Amazon will track it from the distribution center to you. The bar code on the package enables this, and can provide virtually instant confirmation of delivery. Similar labeling and scanners within Amazon's facilities enable inventory management. This technology benefits asset management by informing Amazon.com that the item has reached its destination and allowing the company to see how many are still available to order.

The military sustainment community uses this technology extensively, providing sustainers the ability



to properly inform commanders of assets in transit. The U.S. military has the world's largest active radio frequency in-transit visibility network, spanning 41 countries with 1,749 RFID tag read-and-write sites and more than 570 satellite-enabled tracking systems. Passive RFID, an electronic identification technology comprising a chip and antenna imbedded within a label, is also used in the defense supply chain but is not designed to carry large amounts of data and is not currently approved for use on ammunition and missiles.

In the continental United States, AIT suites support the receipt of sustainment supplies and equipment in the Army's organic industrial base, comprising 23 manufacturing arsenals, maintenance depots and ammunition plants. The AIT suite can be used to track the inventory in short- or long-term storage awaiting issue to units. U.S. Transportation Command, which leads the joint deployment and distribution enterprise and is the proponent for AIT and in-transit visibility, has been looking for additional ways to take strategic advantage of AIT to support commanders who have to make logistics decisions in tactical and operational missions.

One of the most important functions of AIT at theater ammunition supply points is the ability to process serial numbers, using handheld terminal bar code readers, on items such as guided missiles and large rockets during receipt and inventory of ammunition material. The use of AIT can reduce a full day of checking serial numbers to a matter of a few minutes, freeing personnel to perform other critical tasks.

#### **IMPLEMENTATION OF AIT**

The Joint Ordnance Commanders Group, a flag and general officer forum in which

all the services' conventional ammunition stakeholders jointly define and improve munitions management systems and execution, has an AIT subgroup that in 2011 implemented joint ammunition package label specification. The objective was to streamline bar code processing and effectively use AIT to enhance tracking systems and standardize labeling and tasks.

The Army has created a policy to procure AIT suites and have them available at theater ammunition storage activities through the system managed by the Product Lead for Logistics Information Systems under the Program Executive Office for Enterprise Information Systems. However, the Army faces many chal-

**Together, those systems can provide the in-transit visibility that the military requires; commanders will have the critical information they need.**

lenges in adopting new technology of value to ammunition management, such as network constraints and a lack of training on the use of AIT.

The ability to use AIT and integrate it with military ammunition systems is the key to AIT's rapid acceptance. Its primary use is to facilitate data management in the areas of cost, processing time and data accuracy.

AIT can replicate bar code data, reducing the risk of keystroke errors that can create shortages and take time for inventory personnel to correct. Additionally, AIT can help monitor how responsive the supply chain is to commanders' requirements for battlefield munitions.

#### **AIT UNDERUSED IN THE FIELD**

The Army uses the Standard Army Ammunition System (SAAS) as its web-based ammunition system to provide accurate, real-time stock status in a theater of operations. The ammunition system is used at the point of issue and management levels. The real-time transfer of data makes the management of munitions more precise and satisfies the commander's requirements for tactical information on conventional ammunition. While the system offers the ability to track munitions on hand, it relies on personnel to manually receive and inventory ammunition, a time-consuming process. At the same time, the units have AIT on hand but are not able to use it.

The total cost of the AIT suite is approximately \$19,000 for a system at an ammunition supply point and \$8,000 for a system at a unit ammunition transfer and holding point. Generally speaking, these prices are on the low end compared with the newer technology currently available through the indefinite-delivery, indefinite-quantity contracts for AIT. The equipment is authorized to 55 support battalions and 18 ordnance sections. Despite a sizable investment of about \$782,000 in handheld terminals and portable printers for forward ammunition support activities, Soldiers in the field are not able to use the AIT equipment to conduct inventories or receipts. It remains underused, or not used at all.

## CHALLENGES TO OVERCOME

One of the challenges in adopting AIT is developing institutional knowledge. While the military occupational specialties 89A (ammunition stock control and accounting specialist) and 890A (ammunition warrant officer) are responsible for SAAS, AIT is not part of their professional military education. At the unit level where the AIT resides, Soldiers thus find themselves with equipment they cannot operate.

An operational challenge is that the USB cradles for handheld terminals must be plugged into a computer on the Non-Secure Internet Protocol Router network, requiring an exemption from the network enterprise center for USB activation. Without the cradle, the data cannot transfer from the handheld devices to the website application. Additionally, information technology personnel do not have the experience to integrate handheld terminals with the SAAS and cannot configure AIT equipment for use at units. To process AIT and RFID, the handheld terminals must be preloaded from the product lead's offices.

In 2017, the transition from the server-workstation ammunition system to the new web-based system changed the interface between the system and AIT. Since that transition, the product lead has been overwhelmed with trouble tickets to fix errors discovered after implementation. The initial vetting of the website did not account for the many problems that each ammunition supply point faces. In the Japan theater of operations alone, stock control clerks submitted 26 tickets in the first five months of migrating the database to the servers at Fort Lee, Virginia. Keeping up with the baseline website has been the priority of the product lead, and anything AIT-related has been a low priority, as manual procedures may be used in its place.



## FASTER INVENTORY PROCESSES

One of the most important functions of AIT at theater ammunition supply points is the ability to process serial numbers, like the ones shown on these bar codes, using handheld bar code readers. AIT can reduce the time it takes to check serial numbers from days to minutes. (Photo by Terrence Oxiles, 8th Theater Sustainment Command (TSC))



## WHAT'S ON HAND?

Automated inventory equipment like this, checked by the Washington National Guard 10th Civil Support Team before an April training exercise, makes it possible for commanders to track cargo and materiel from production to forward storage areas. (U.S. National Guard photo by Joseph Siemandel)



While the team at the product lead office created a great website that replicates the setup of servers and workstations in the ammunition system, the AIT suite still sits idle at locations that cannot implement hardware involving the local network enterprise center and integrated with the newest version of the software. One of the major difficulties is the inability to fix the transfer of data from the handheld terminal to the ammunition system. The product lead team has waited for the next software version to correct serial number errors in inventory transactions.

The inability to use AIT at theater ammunition supply points also stems from current policy and procedures. The use of AIT should be part of the automated receipt and inventory processes, and the definition of administrative adjustments should include errors with AIT. This would give commanders and officers responsible for supplies waiting to be issued flexibility in using AIT for accountability functions. Current Army inventory processes still mandate the use of a counter and recorder with DA Form 2000-3, Installation Inventory Count Card, for manual procedures, or the SAAS-generated inventory count sheet for automated procedures. The reason for not integrating AIT into automated procedures is that much of the current Army ammunition management regulation mirrors what was written in 1998 for supply support activities.

### EFFECTIVENESS OF AIT FOR AMMUNITION

Theater ammunition aside, the organization with the most experience in managing ammunition is the Army's organic industrial base under Joint Munitions Command, which manages all of the ammunition plants and depots in the continental United States. These facilities use a different ammunition system. Implemented in 2015, the Logistics

## AVAILABLE TECHNOLOGY

Army policy directs that all commanders with AIT fully integrate the accountability functions of receipt, storage, inventory, issuance and shipment of sustainment materiel. The AIT suite can be used to scan bar codes. The DOD supply chain uses three types of symbols: linear bar codes, 2D PDF417, and the 2D data matrix. Bar codes carry a maximum of 15 to 20 characters. The 2D symbols are more complex: PDF417 symbols contain address and package identification. Data matrix symbols are used for mandatory unique-item identification.

Active RFID tags contain the same information as packaging labels, and are used in tagging a variety of assets in transit and to provide location information when shipments of containers pass RFID interrogators at network nodes. One of the leaders in the supply chain industry that uses AIT and RFID technology is Walmart Inc. Walmart has been using universal product codes (found on linear bar codes) since 1983 to collect information for analysis to support strategic distribution and supply plans. The company's supply chain uses RFID to track pallets of merchandise, and employees use handheld scanners to read smart tags and identify which items need to be restocked. The military has leveraged these same technologies.



### FILLING THE TRAINING GAPS

Terrence Oxiles, part of the 8th TSC Munition Branch, conducts hands-on AIT training in May 2018 with local national employees of 10th Support Group Ammunition Depot in Honshu, Japan. Because AIT is not part of the professional military education for some ammunition Soldiers and NCOs, Soldiers at the unit level where the AIT resides often find themselves with equipment they can't operate. (Photo by Mami Wakita, 10th Support Group)

Modernization Program (LMP) allows national-level ammunition management to integrate multiple systems for receiving, storing, surveying and issuing ammunition.

With the latest version of LMP, data goes directly from standardized AIT handheld terminals into the national ammunition system, improving the accuracy and timeliness of data as well as reporting for strategic management. The acquisition functional lead for LMP reported that organic ammunition depots have fully functioning “store and forward” AIT, which allows employees to send information to intermediate stations where it is stored and sent later to the national ammunition system.

An ammunition plant as large as McAlester Army Ammunition Plant in Oklahoma, for example, requires the use of AIT. The ammunition plant, one of the largest, sits on 44,964 acres with 2,826 buildings, including 2,263 earth-covered storage magazines, 173 storage warehouses and a storage capacity of 8.8 million square feet.

## CONCLUSION

Ultimately, the benefit of advanced technology depends on the training and skills of the people who employ the technology. AIT works only as well as the capability of the ammunition system, supply policy and processes, and the training provided. These factors cannot be taken separately; until they are combined for an effective result, at best only a fraction of the optimal in-transit visibility solution will be available.

The problem requires the Product Lead for Logistics Information Systems to develop and implement effective AIT in the field for Soldiers and civilians who use the ammunition systems. The product lead must make integration of AIT into SAAS a priority and take corrective action on the backlog of errors with AIT. Additionally, end users need a stand-alone guide on how to use the software and send data from AIT to computers with the new version of SAAS, and IT personnel need training support packages to help them set up the software on computer systems for AIT.

With proper initiative and training at all levels, Army employees and Soldiers can conduct receipt and inventory of ammunition supplies with AIT, improving cost, processing time, accuracy and performance monitoring of data while informing commanders of stock availability and developing the commander's requirements needed to win our nation's wars. A combination of updated doctrine and user manuals, along with training support packages,



## BLACK AND WHITE AND READ ALL OVER

The DOD supply chain uses three types of symbols: from top, the 2D PDF417 label, which contains address and packaging identification; the linear bar code; and the 2D data matrix label, which is used for mandatory unique-item identification. (Image courtesy of the author)

can give the ammunition community the push it needs to change how it completes ammunition operations and processes.

For more information, go to [https://usarmyamis.army.mil/Contracts\\_AITV.html](https://usarmyamis.army.mil/Contracts_AITV.html).

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### MAJOR PLAYERS

First Lt. Nathaniel Zimmerly, a contract officer for Joint Forces Command – United Assistance, tours an Ebola treatment unit built in support of Operation United Assistance in Tappita, Liberia, in 2014. The intelligence gathering process spelled out by the author was used to great effect to aid contracting officers in Liberia and Sierra Leone. (U.S. Army photo by Sgt. 1st Class Brien Vorhees, 55th Combat Camera)

# BRINGING INTEL TO CONTRACTING

Intelligence collection isn't just for battle planning. It also has demonstrated its value in contracting with information on vendors, insider threats, and fraud, waste and abuse.

*by Russell Parman*

During my past seven years of working as an intelligence specialist supporting U.S. Army Contracting Command (ACC), I have witnessed a gap in understanding between what intelligence is and what it can be in support of logistics. Many senior leaders have spent their careers with limited exposure to intelligence capabilities, most often limited to the support provided by their battalion or brigade S-2 cells in theater. Experience with intelligence combat capabilities often results in surprise when a leader sees what intelligence professionals have been doing for years at higher-level commands.

For example, intelligence has proven its value in contractor vetting.

In 2007 the Army faced a significant threat to its contracting operations. An August 2007 Army Times article reported that there had been dozens of instances of contracting officers, both military and civilian, being found guilty of accepting bribes. That October, the Gansler Commission released its report, "Urgent Reform Required: Army Expeditionary Contracting," which led to the creation of ACC in 2008. ACC's mission was to oversee the vast majority of Army contracting operations. In theory, this oversight would reduce the risk of compromise of key U.S. technologies, improve the safety of our Soldiers who were responsible for providing contracting support throughout the world, and eliminate fraud, waste and abuse.

I began work in ACC G-2 (Intelligence and Security Directorate) in September 2010 as the senior intelligence specialist. While we were standing up the organization, our support to the command was limited initially to providing current intelligence, which included but was not limited to intelligence summaries, weekly threat briefings to key leaders, and black book (classified intelligence documents on current events) briefings to senior leaders of pertinent world events that affected our operations.



After a couple of years, we began to see opportunities to expand our support to include the vetting of foreign vendors, with the goal of reducing the risk of exposure of our deployed contracting specialists to nefarious actors. To do this effectively, we had to improve our knowledge of the contracting process and of how our adversaries were able to exploit weaknesses in our system.

### THREATS AND RISK REDUCTION

There are two major ways our logistical lines are at risk through the contracting process. First, forward operating bases are often in locations where resources are limited, and contracting officers often lack the ability to effectively vet local businesses to ensure that they are not also working for our adversaries. A 2016 Fox News report found that nefarious actors in Afghanistan over the past several years, including warlords, gangsters and terrorists, had been able to access some of the \$114 billion spent repairing the infrastructure in that country. Often these individuals were able to gain access to key facilities and provide intelligence to our adversaries.

Exacerbating the risk of this insider threat, there has been a lack of credible intelligence on the local human terrain (local population factors that can impact the mission). Linguistic limitations among U.S. personnel have forced the Army to rely on local vendors to provide interpreters.

Secondly, the contracting process has been fraught with theft and corruption. A 2015 report to Congress by the Special Inspector General for Afghanistan Reconstruction found about \$279.5 million in questionable costs associated with contracting in Afghanistan. The report found that these questionable costs in



### LINES OF COMMUNICATION

First Lt. Joel Silver and a local leader discuss a contract under which local contractors and villagers built a school, a well and a water tower in Kakla Cot, Afghanistan, in 2010. Contractor vetting is critical to mitigate risk when adversaries would use this access to collect intelligence for future targeting. (U.S. Air Force photo by Airman 1st Class Robert Hicks)

some instances provoked criminal investigations that yielded guilty pleas and fines. As a result of the investigations, members of the U.S. military and government contractors pleaded guilty to corruption charges. The charges included theft, bribery, money laundering and conspiracy to defraud the U.S. government.

### BUILD A BODY OF REPORTING

Most intelligence-supporting contractor vetting will come from human intelligence (HUMINT) sources, especially

in countries where the U.S. Embassy is the only footprint. HUMINT collectors in these countries require guidance from intelligence consumers, which often comes from the analysts who evaluate intelligence information reports.

The best way to focus intelligence collection efforts is to provide an intelligence collection requirement. I authored ACC's first requirement in order to improve coordination between my analysis and intelligence collectors worldwide. The requirement focused on threats to

## The use of intelligence can greatly enhance logistics and address the current threat environment, which includes insider threats, intelligence collection, terrorism, fraud, waste and abuse.

contracting with an emphasis on terrorism, criminal enterprises and intelligence collection threats. The intent was to increase the body of reporting in order to improve contractor vetting.

The biggest role of intelligence is to provide an understanding of the battlefield that prepares our forces for conflict. Often our contracting officers are going into challenging situations without a full picture of the threats. Using the methodology shown in Figure 1 (Page 105), intelligence can better serve deploying contracting officers in countries where there has not been a significant American presence.

After establishing the intelligence collection requirement, I set up search profiles on the intelligence research platform Multi Media Messenger, using key terms that would find all reporting related to contracting, most often in the form of intelligence reports. The reports were provided by local intelligence assets, most often working at U.S. embassies, who had a good understanding of the local dynamics in areas with a limited intelligence footprint.

Often contingency operations require the United States to go into new areas where local knowledge is limited. By creating an intelligence collection requirement, we provided a road map for human intelligence collectors to task local assets and provide a foundation for reporting on which businesses to avoid and those that would provide reliable, quality services. As a result, our body of reporting increased as we opened direct lines of communication with those who could do the research on the ground. The resulting reporting helped in producing dozens of country reports on vendors, both reputable ones and those who could present threats.



### BASE OF SUPPORT

Local Afghans build a water point in Kunar province, Afghanistan, in 2009, as part of a project contracted by the U.S. Army. Intelligence gathering efforts can help to identify reputable contractors in countries where data on vendors is limited. (U.S. Army photo by Spc. Evan Marcy, 55th Combat Camera)

Using an unclassified search engine, intelligence analysts conducted searches for the names and addresses of reputable vendors. The search engine would populate datasets that include company name, services provided, key personalities, identification numbers and addresses. The searches also provided details on which companies had a multinational presence as well as a history of services rendered to the U.S. government.



With this information we created datasets that included thousands of vendors worldwide who could provide services and had been vetted against HUMINT reporting. Using this process, we were able to provide direct support to our personnel deploying to West Africa in response to the Ebola outbreak in 2014. This support came in the form of a list of vendors we found and were able to vet against existing intelligence reporting for potential threats. Additional data was produced for dozens of countries, with tens of thousands of vendors found and vetted, and dozens of instances of potential risk identified.

Once I had a finished product for a specific country, I would use the Human Online Tasking Resource, an online repository of intelligence reporting, to author evaluations for intelligence collectors to ensure that they received the necessary feedback. As a result, HUMINT collectors better understood the need for this type of intelligence and now had an incentive to continue collecting information on local vendors.

It is often stated that “the squeaky wheel gets the grease,” and HUMINT collectors are more likely to try to feed intelligence to those who provide them with critical feedback. In this instance, intelligence report evaluations are a necessary and valuable tool for intelligence analysts. Additionally, the analyst has the opportunity to directly task the human intelligence collector through source-directed requirements. Every analyst answers to a customer, and those requirements provide a direct means for the intelligence consumer to ask follow-on questions.

## CONCLUSION

Intelligence has tremendous utility for contracting if decision-makers in charge of resources make use of existing methodologies. The intelligence reporting system



## STOPPING FRAUD

Spc. Rosalba Vargas, 888th Movement Control Team, checks out a contracted truck as it leaves a transport yard Feb. 27 in northern Kuwait. In years past, Afghan truck drivers were frequently contracted to support logistical lines and often engaged in fraud. (U.S. Army photo by Sgt. Edward Ruiz, 184th Sustainment Command)

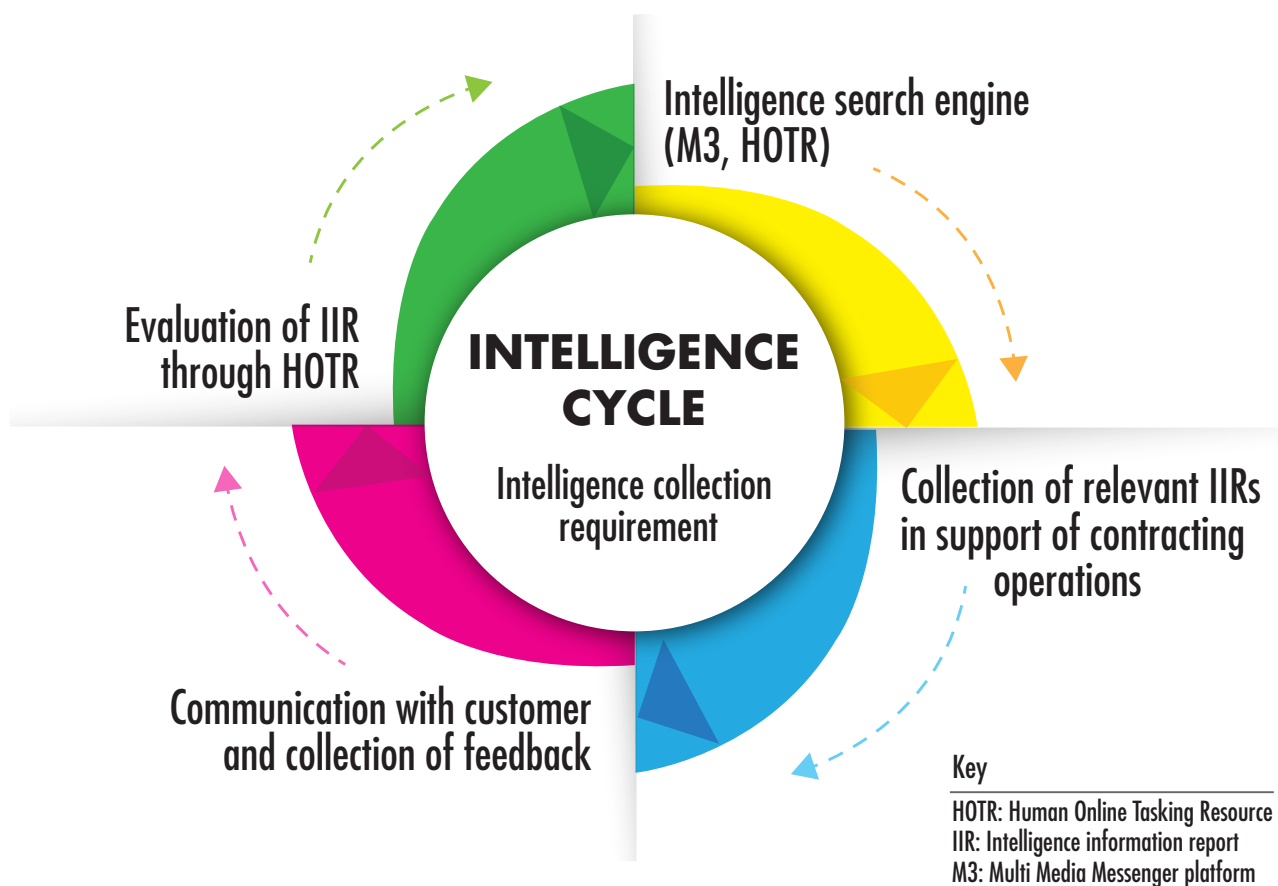
is already in place and shows how analysts can use available resources in the intelligence cycle to provide good information that did not previously exist.

Intelligence analysts must use all available tools to provide the best available information to those in need of their intelligence. The use of intelligence can greatly enhance logistics and address the current threat environment, which includes insider threats, intelligence collection, terrorism, fraud, waste and abuse.

For example, the Multi Media Messenger platform and the Human Online Tasking Resource, used jointly, allowed me to build an intelligence program from scratch. The program provided a necessary service to our consumers at ACC, allowing for risk management and mitigation and facilitating intelligence preparation by finding reputable contractors in countries where limited data on vendors exists.

Unfortunately, this program was discontinued in 2016 because of personnel cuts.

FIGURE 1



#### THE MORE YOU KNOW

Contracting officers deploying to countries that lack a significant American presence can follow these steps to use intelligence tools to assess the threat environment and identify fraud, waste and abuse. (Graphic by U.S. Army Acquisition Support Center; SOURCE: the author)

Before it was discontinued, dozens of countries had vendor lists produced for each combatant command that were vetted against existing intelligence reporting. Should the program be resumed, additional areas of growth would include analysis of risks in foreign military sales from foreign intelligence, exploitation of U.S. military hardware by foreign actors after sale to partner nations, and the use of contracted logistical support to gain access to U.S. facilities.

For more information, contact the author at [russell.d.parman.civ@mail.mil](mailto:russell.d.parman.civ@mail.mil).

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# FROM SENSOR



## THUNDER

A 101st Airborne Division Soldier pulls the lanyard on an M777A2 howitzer during a fire mission in January in Southwest Asia. The 101st Airborne Division Artillery, stationed at Fort Campbell, Kentucky, participated in the Army and Air Force sensor-to-shooter exercise. (U.S. Army photo by Spc. Gyasi Thomasson, Combined Joint Task Force – Operation Inherent Resolve)



How a demonstration of translating targeting data between the Army and the Air Force confirmed a prototype for long-range precision fires in multidomain operations.

# TO SHOOTER FASTER

*by Maj. (P) Isaac Lewellen,  
Chief Warrant Officer 3  
James Patrick  
and Larry Jennings*



All parties were on standby, eager to take the next step toward operationalizing a prototype capability in software translation and demonstrating its utility over active military networks.

As part of a two-week plan, the team conducted initial connectivity and quickly identified network and configuration issues. They immediately began to work through the hurdles, and after a few days of additional testing and development, addressed the technical issues. The team was ready to launch the exercise.

This time they were on familiar ground, initiating communications from the Air Force's Common Mission Control Center at Beale Air Force Base, California, to the 101st Airborne Division Artillery at Fort Campbell, Kentucky.

The goal was to provide insights and help prove a critical new capability in software translation: converting, in real time and strictly from machine to machine, an Air Force Universal Command and Control Initiative message to the Army's Variable Message Format. A message from one service's message system had been converted to another service's messaging format in a lab many times; this would be the first such conversion in an operational setting. It would show an initial sensor-to-shooter capability that could pass targeting data between services to the Army's fire control system.

Here's why this message conversion is necessary. Today, communicating between these Army and Air Force systems requires Soldiers and Airmen to monitor or scan a multitude of internet relay chat windows or other communications, and then manually transfer and input data into their respective systems. This can lead to time delays and possible human errors. A conversion is required in order to allow these two systems to communicate machine-to-machine.

Unfortunately, this is not as simple as just converting messages on a one-for-one basis. In some cases, it takes multiple messages from one format to create a single message in the converted format. When conversion is successful, it allows the Army access to Air Force intelligence, surveillance and reconnaissance assets, and the

Air Force access to Army fires units without having to go through layers of organizations, thereby speeding up the kill chain process and reducing the chance of targeting errors.

Back to the test meant to solve this problem: At the helm were the Army Rapid Capabilities and Critical Technologies Office (RCCTO), the Air Force Rapid Capabilities Office (RCO) and the 101st Airborne Division Artillery. To launch the demonstration, the Air Force RCO selected a critical target within an area of responsibility outside the range of Army sensors and initiated a call for fires from the Common Missile Control Center. This initial sensor message was downlinked to the control center and initiated the call for fires, which was seamlessly translated from the Air Force Command and Control Initiative standard to the Army Variable Message Format standard and delivered to the 101st at Fort Campbell.

Despite the different systems, it only took minutes to complete the machine-to-machine transfer. As a result, the services can begin to move from a linear, static and stovepiped kill chain to a situation in which the kill chains overlap and all the domains of

war are interconnected into one network to create a "kill web" with multiple paths. Using the machine-to-machine translation reduced the chance for human error, while significantly decreasing the time traditional dynamic targeting takes to execute. The process demonstrated the value of leveraging sensors that are not organic to the Army—such as Air Force sensors—while opening up the strike options for the Air Force. The adapter enabled more timely prosecution of critical targets in the conduct of multidomain operations.

## Next, the RCCTO team is planning to conduct a possible end-to-end test of the entire sensor-to-shooter kill chain.

### INFORMATION AT THE NEEDED SPEED

In a complex fight in an anti-access and area denial environment, the time it takes to deliver information from sensor to shooter is critical. Recognizing the need to speed up long-range fires communication and execution among the services, the chiefs of staff of the Army and Air Force directed that an Army-Air Force summit be held. At the summit, in August 2018, the two services focused on applying and integrating their open-architecture technologies and approaches to boost speed, precision and agility on



### AND LIGHTNING

A 388th Fighter Wing pilot waits to taxi before launching on the F-35A Lightning II's first deployment to the Middle East. The Army RCCTO and the Air Force RCO recently tested the technical feasibility of getting Air Force and Army systems to pass messages to each other, so that fires systems and targeting systems can communicate directly without the time-consuming and error-introducing process of having humans translate the messages. (U.S. Air Force photo by Ronald Bradshaw, 388th Fighter Wing)

the battlefield. The sensor-to-shooter demo, executed on April 5, was one outcome of this summit.

The purpose of the sensor-to-shooter prototype was to demonstrate the technical feasibility of a machine-to-machine data flow for targeting that would allow Air Force sensors to direct Army fires. Although multiple processes and associated methods are available to execute cross-domain dynamic targeting, the RCCTO solution is unique in leveraging an existing Air Force sensor platform and applying limited software development to translate message formats in near-real time for consumption by Army firing platforms.

As an initial proof of concept, the prototype showed the integration power of Air Force intelligence, surveillance and reconnaissance systems in passing targeting data, machine to machine, to Army fires in an operational scenario. It leveraged modular open-systems approaches to sensor and weapon integration, in which information sharing in real time is key to neutralizing the threat.

Doing so leaves the door open for new, and ever-evolving, ways to sense and identify targets and establishes the ability to neutralize the target with a new or updated weapons package without having to re-implement the solution. Achieving rapid



machine-to-machine information sharing requires common standards and well-defined system interfaces.

### LESSONS LEARNED

In preparation for the live demonstration, the RCCTO partnered with the Systems Integration Lab of the U.S. Army Combat Capabilities Development Command's C5ISR Center at Aberdeen Proving Ground, Maryland, to create a development environment. This consisted of computers hosting "virtual machines" of the Air Force's Common Mission Control Center software, the message translation software and the Army Advanced Field Artillery Tactical Data System application—that is, the sensor that would detect a target, the software that would translate the message generated by the sensor, and the artillery that would fire on the target.

**In a complex fight in an anti-access and area denial environment, the time it takes to deliver information from sensor to shooter is critical.**

The early testing enabled proper translation and formatting of the critical message traffic.

Both the lab testing and the demonstration highlighted the need for more standard workflows for fires units when passing messages to joint forces, including observer mission updates. Additionally, capabilities for sharing situational awareness could be enhanced to streamline the air and ground fires clearance processes while minimizing the potential for friendly fire or fratricide.

Additional analysis will be necessary to move toward greater use of common standards. On a modern battlefield, with multiple units and multiple services, this becomes a much more complex idea that will require the application of advanced machine learning and artificial intelligence. One of the key assumptions behind the April demonstration vignette is that the sensor detects an unplanned target as a "Joint Force Commander Critical Target," as described in the multiservice tactics, techniques and procedures publication for dynamic targeting. These particular targets typically represent a very small portion of the total, and in most cases require an immediate response because of the potential danger to friendly forces.

### CONCLUSION

The sensor-to-shooter team successfully demonstrated the technical feasibility of machine-to-machine connectivity facilitating Air Force and Army bidirectional message passing. Next, the RCCTO team is planning to conduct a possible end-to-end test of the entire sensor-to-shooter kill chain. This expanded chain will yield additional lessons learned and insights into machine-to-machine execution and the time to completion of complex kill chains. Additional development could explore an early discussion on hosting the

adapter software at an Army unit, creating a more direct link from an Air Force platform to an Army fires unit. Collaboration with U.S. Army Europe continues, with G-3 Fires and G-6 providing input and expertise for continued development of a direct link test and network connectivity for the current software.

Ultimately, the Army will need to conduct additional exercises to evaluate message flows in disparate geographic locations to further operationalize the technology. One of many sensor-to-shooter efforts, this will be an important step in creating a better integrated and more lethal joint team to defeat anti-access and area denial measures.

*For more information, go to the RCCTO website at <https://rapidcapabilitiesoffice.army.mil>.*

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# CYBER VS. DRONE

Small drones are increasingly a threat to Soldiers. A new cyber-enabled system provides a key countermeasure.

*by Nancy Jones-Bonbrest*



## OPERATIONAL REALISM

Cyberspace operations specialists with the Expeditionary Cyber Support Detachment, 782nd Military Intelligence Battalion (Cyber) provide support to a training rotation for 3/1 CD at NTC in January. New cyber-enabled C-UAS prototypes complement electronic warfare systems to combat enemy drones, which are a growing threat to U.S. ground troops. (U.S. Army photo by Steven Stover, ARCYBER)

In the desert of the National Training Center, Soldiers got an opportunity to try something completely new. Along with the challenges of 14 grueling days of force-on-force and live-fire training exercises, the 3rd Brigade Combat Team, 1st Cavalry Division (3/1 CD) tried out a cyber-based prototype that complements electronic warfare systems to combat enemy drones, which are a growing threat to U.S. ground troops.

Using the Army's enhanced cyber-enabled Counter-Unmanned Aerial System (C-UAS) capability, Soldiers with the 3/1 CD were able to detect and counter common small drones during their training. The new prototype alerted Soldiers to the presence of a drone and provided a means to target it, for protection across the brigade.

This integration of cyber-enabled prototypes with existing signal, intelligence and electronic warfare capabilities allowed the Soldiers to fix on a target and engage their fires cell, said Capt. Christopher Packard, electronic warfare and cyber electromagnetic activities chief for the 3/1 CD.

"That's the goal right there, to reach the commander's end state and to meet his intent for lethal targeting—those are some of the main concepts to focus on," Packard said. "I think we've done well here, getting intelligence information as it's passed ... that we can use for targeting. I'm looking forward to seeing where this goes in the future."

## CYBER SOLUTION SOUGHT

While the Army has a wide variety of solutions to counter drones, the new capability focused on bringing precision cyber techniques to bear as a complement to those other C-UAS systems. A small group of software developers within the U.S. Army Cyber Command (ARCYBER) and the Defense Digital Service custom-built software, developed a user-focused design and modified commercial off-the-shelf equipment to create pilot systems in early 2018.

Growing demand for a more robust and scalable solution generated a need for a rapid prototype. The Defense Digital Service completed the specialized software of the pilot system and transitioned development of a prototype to the Army Rapid Capabilities and Critical Technologies Office (RCCTO), which crafted an



acquisition approach that integrated software and hardware. Working with Tobyhanna Army Depot and ARCYBER, RCCTO launched prototype production in November.

In less than three months, the integrated team sprinted and surged to deliver the new cyber C-UAS capability to the 3/1 CD. The new system is an interim solution that will continue to evolve as the Army applies direct Soldier feedback to improving design and performance. The integrated team is incorporating feedback from the unit's rotation at the National Training Center (NTC) at Fort Irwin, California, which took place Jan. 7-25, as they develop a phase two prototype, to be delivered later this summer.

"This effort allowed the 3/1 CD to receive valuable C-UAS training ahead of their upcoming mission set," said Jack Dillon, RCCTO's cyber lead. "It also provided critical feedback that we are already feeding into the next version."



### TRIAL BY CYBER

Capt. Adam Schinder, commander of the Expeditionary Cyber Support Detachment, 782nd Military Intelligence Battalion (Cyber), provides command-and-control for cyberspace operations specialists with the detachment that supported training for the 3/1 CD at NTC in January. (U.S. Army photo by Steven Stover, ARCYBER)

### A FAST-MOVING TEAM

Receiving a request to produce a never-used-before, cyber-enabled C-UAS on Aug. 22 and delivering it by Nov. 12 is not business as usual. However, ARCYBER, RCCTO and Tobyhanna, working in lockstep, were able to deliver.

"The RCCTO and Tobyhanna helped out with taking it from an advanced prototype and turning it into an engineering design model," said 1st Lt. Aneesh Patel, with ARCYBER's Cyber Solutions Development Detachment – Georgia, 782nd Military Intelligence Battalion, 780th Military Intelligence Brigade. "We designed our own hardware and schematics, but what we didn't have was the proper ability to scale, and I think that's important in a bridging strategy and for any prototype."

The ability to turn a concept into a small package of operational prototypes for use by a unit required a proper yet flexible acquisition strategy that would also set the foundation for increased production later. In turning a concept into an operational prototype, Tobyhanna had to put together a complete drawing package using items from the depot and create the prototype while keeping to strict quality standards.

"We must do everything per Army regulations," said Joe Lynn, a project manager for Tobyhanna Army Depot, located in Pennsylvania. "So, once everyone came on-site and saw what we do here, and that we're basically a one-stop shop from concept to combat, it brought a better understanding."

The process also required constant communication. This came in the form of coordination on the ground during the NTC rotation with the unit's electronic warfare Soldiers, and during biweekly technical and synchronization meetings involving Tobyhanna, ARCYBER, the Defense Digital Service and RCCTO. Tobyhanna also hosted multiple face-to-face meetings to expeditiously solve technical questions and challenges. On the project management end, RCCTO worked in parallel to address typical program, legal and budget reviews. Of particular note, in addition to constructing the prototype from an engineering concept, the RCCTO, ARCYBER and Tobyhanna put in place a training plan for the 3/1 CD.

### SOLDIER INPUT, ON THE GROUND

This rapid approach unfolded on the ground at NTC, as Soldier input went directly to engineers on-site so that they could make changes quickly, sometimes within hours.

“Having that agility really made it possible to have mission success and also to get a lot of feedback to better the system,” Patel said. “Being a newer system and a new tool for a maneuver unit, there are going to be a lot of things we don’t know as [cyber] engineers, and a lot of their specific needs for the capability that may not have gotten through to us. So being out there was very important to this and any other project like it.”



For example, to enhance the overall training experience, RCCTO, Tobyhanna and ARCYBER were able to quickly design and deliver custom mounting systems consisting of cables, brackets and other hardware for vehicle and fixed-site implementation during the prototype deployment at NTC. This fixed-site configuration, part of the unit’s tactical operations center (TOC), was a new design put together days before the unit received it, and proved paramount to Soldiers’ effectiveness in using the system.

“We fielded a completely new configuration kit, the TOC kit,” said Capt. Adam Schinder, commander of the Expeditionary Cyber Support Detachment, 782nd Military Intelligence Battalion. “It was perhaps the most successful implementation of the C-UAS solution. As a result of being statically configured and continuously monitored and plugged in, the unit found the TOC kits extremely successful.”

During the 3/1 CD’s rotation, ARCYBER embedded five Soldiers with the NTC’s opposing force who had the ability to attack the unit with their own “enemy” drones, thus providing more realistic training.

“The system was able to give the supported unit situational awareness of drones that threatened the formation across a wide front,” Schinder said. “It alerted the unit

### GREATER THAN THE SUM

A Soldier with ARCYBER’s Cyber Solutions Development Detachment – Georgia, 782nd Military Intelligence Battalion (Cyber), 780th Military Intelligence Brigade, shows James Serafin, with Tobyhanna Army Depot, how to assemble the cyber-enabled C-UAS prototype. “The RCCTO and Tobyhanna helped out with taking it from an advanced prototype and turning it into an engineering design model,” Patel said. (U.S. Army photo courtesy of Tobyhanna Army Depot)

to the presence of the drone, and then it provided automated force protection at the request of the operator. Simply put, we flew the drones, we deployed the devices and we successfully defeated the threat.”

### CONCLUSION

This phase-one cyber precision drone detection system will be followed by an upgraded phase-two version slated for delivery to the U.S. Special Operations Command for an operational assessment this summer. Phase two will maximize the capability’s operational life span by incorporating multiple software updates to improve performance. Both efforts will begin to help inform the Army’s overall requirements for cyber-based C-UAS.

Already, RCCTO and ARCYBER are coordinating with partners in the C-UAS community to optimize investments and share technical cyber approaches. They are also advancing new versions that are software-based for easy portability into mounted and dismounted C-UAS platforms.

“Ultimately, the momentum gained through this partnership will increase cyber integration into equipping efforts within the multidomain operations paradigm,” Dillon said. “It’s a great example of the type of partnership that can produce meaningful operational prototypes while setting conditions for transition to programs of record.”

*For more information on the Army RCCTO, go to <https://rapidcapabilitiesoffice.army.mil>. For more information on ARCYBER, go to <https://www.arcyber.army.mil>. For more information on Tobyhanna Army Depot, go to <https://www.tobyhanna.army.mil>.*

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## CAPT. ZACHARY SCHOFIELD

**COMMAND/ORGANIZATION:** Product Manager for Wideband Enterprise Satellite Systems, Project Manager for Defense Communications and Army Transmission Systems, Program Executive Office for Enterprise Information Systems

**TITLE:** Assistant product manager

**YEARS OF SERVICE IN WORKFORCE:** 1

**YEARS OF MILITARY SERVICE:** 14  
(9 as a commissioned officer)

**DAWIA CERTIFICATIONS:** Level I  
in program management

**EDUCATION:** M.A. in information technology management and MBA, Webster University; B.A. in liberal studies focusing on anthropology, Georgia Southern University

**AWARDS:** Meritorious Service Medal, Army Commendation Medal (3), Army Achievement Medal (2), Meritorious Unit Citation, Afghan Campaign Medal, National Defense Service Medal, Iraqi Campaign Medal (2), Global War on Terrorism Service Medal, Korean Defense Service Medal, Noncommissioned Officer Professional Development Ribbon, Army Service Ribbon, Overseas Service Ribbon (3), NATO Medal, Air Crew Member Wings

## OUT-OF-THE-BLUE SOLUTION MAKES SUSTAINMENT EASIER

Thanks to Capt. Zachary Schofield and his team—and a piece of blue construction paper—logisticians and sustainment personnel in Korea have a communication system that’s lighter, smaller and much easier to use.

As the assistant product manager for the Combat Sustainment Support Satellite Communications Program, Schofield led the team fielding the Army’s new Inflatable Satellite Antenna (Very Small Aperture Terminal), or ISA-VSAT, to 8th Army in response to an operational needs statement. “We redesigned an existing satellite antenna, the T2C2 [Transportable Tactical Command Communications] Lite, and the Army gateways for the WGS [Wideband Global SATCOM] satellite network tie-in, making it simpler to install, operate and maintain than any triband-capable terminal fielded in the Army.”

The new systems “are dramatically smaller, lighter, more powerful and redundant than anything else currently used in the Army,” he said. “The sustainment community in Korea—and select stateside units—is now positioned to be able to move its logistics information systems ... to the extreme edge of the battlefield. They are no longer hampered by systems that require a full truck to move.” The new systems can be transported in two cases, “which allows for sustainment operations anywhere, anytime in the world,” and they can be operated by any Soldier regardless of military occupational specialty. “We don’t need to have school-trained signal Soldiers to enable the sustainment missions—the logisticians can do it themselves,” Schofield said.

The ISA is lighter and more expeditionary than the legacy version. Two Soldiers can set it up in less than 30 minutes, compared with more than 45 minutes for the previous system. It uses the same portable terminal as the T2C2 Lite, a program of record that provides voice and data communications for operational command posts. Using common equipment means the ISA is already available in the Army supply system.

Fielding the new ISA is a big accomplishment for someone who has been in acquisition for just a year, and Schofield is quick to note that the people he works with were an important component to that success. “All I did was point the program in the right direction and provide some insights from the field,” he said. “We have a team of technicians, engineers, tech writers, trainers and logisticians that really made this program a success. I didn’t do that much in comparison. Even the network and terminal designs that I created were really just poorly drawn sketches on a page of my son’s construction paper that the team made real.”

He also noted that the leadership within the Project Manager for Defense Communications and Army Transmission Systems and the Program Executive Office for Enterprise Information Systems gave him a lot of latitude to run the project as he saw fit. “They were also there to bounce ideas or issues off of, and that allowed me to learn a great deal. It was my project to make work, and I had to learn the details of it.”

Schofield was a signal officer before joining the acquisition workforce and spent two years planning and operating small terminal dishes in Korea. “To be able to take what I know works or doesn’t work and apply it to the systems we are actively fielding has been an amazing experience. We were able to get new systems into the hands of the Soldiers within six months of funding, condensing what is normally a 24-month process.” He added that while these new systems are only for the Korea operational needs statement, “what we learned through the process of designing, procuring and fielding them is directly influencing the next generation of VSATs for the whole Army.”

Looking back over the experience, he noted that he learned a couple of things. At the top of the list is the potential hazard of institutional inertia. “Many of the projects we work on in the Army are multiyear or multidecade projects. It’s very easy to fall into the processes that have always been used, but it’s important to take ownership of your program and question all aspects of how things are done,” he said. “Things we’re doing might have made perfect sense 10 years ago, but now are just outdated. Never let process get in the way of performance.” Second, understand the capabilities of the equipment and the organization. “If you know what the parts, pieces and people can do, it’s easy to shift the plan when you need to.”



### SPECIAL TRAINING NOT REQUIRED

The lighter, more portable satellite terminal Schofield’s team produced can be assembled by any two Soldiers in about 30 minutes. Schofield’s time as a signal officer taught him that “if an item or system requires a field service rep just to operate or maintain it, it’s too complicated, and it won’t be used.” (Photo by Amburr Reese, U.S. Army Communications-Electronics Command Public Affairs)

Schofield’s transition to acquisition was spurred in part by frustration. “Having spent eight years in various S-6 or signal company positions, I was tired of getting new equipment that was so complicated that my Soldiers couldn’t operate it reliably. I figured I could help make new systems simpler for the Army,” he said. “It shouldn’t take a degree in information technology to operate an Army communication system. If an item or system requires a field service rep just to operate or maintain it, it’s too complicated, and it won’t be used.”

Now that he has seen acquisition from a couple of different perspectives, he noted

that one of the things Soldiers often don’t understand are the timelines for Army acquisitions. “At the unit level, it’s hard to see the scale of the Army and the sheer amount of equipment that needs to be fielded. Soldiers can become frustrated by the pace [at which] they receive new equipment without fully understanding the production back end,” he said. “Even if we had unlimited funding, our industry partners can only make so many widgets per year. Sometimes it will take years or even a decade to field a new item to the whole Army.”

—SUSAN L. FOLLETT




## TARGET LOCK

Weapon sights currently under development will be able to provide Soldiers with a display that helps identify targets by classifying items in view as threats or nonthreats and indicating the relative location of “friendlies” and mission objectives. (Image by Getty Images)





# MAGIC BULLETS: THE FUTURE OF ARTIFICIAL INTELLIGENCE IN WEAPON SYSTEMS



AI on the battlefield will come. That's guaranteed. Before AI automates 'slaughterbots,' we need to think through the moral and ethical implications of such powerful technology in warfare. What does it mean for a weapon to be fail-safe? Is a human in the loop necessary or even desirable?

*by Dr. Gordon Cooke*



**W**e live in an era of rapid technological advancement, in which yesterday's pure fiction is today's widely adopted consumer product. Such technologies have created a highly interconnected present. They portend an even more connected and automated future, in which the children who grew up asking Alexa why the sky is blue will be far more comfortable with artificial intelligence than we are today. And they bring with them a host of moral and ethical questions far more complex than any science fiction story.

Gaming out the effects of technology is notoriously difficult. Artificial intelligence (AI) already surrounds us in our devices, cars and homes. We accumulate capabilities and take them for granted as their benefits accrue. But now and again, it's a good idea to stop and try to think about the potential for harm that comes with these technologies. To do that, we have to look at what we have, where it is and where it could go.

Weapons controlled by AI will appear on the battlefields of the future. Despite the protests (more on those in a moment), this is going to happen. Making a cheap, fully automated system that can detect, track and engage a human with lethal fires is trivial and can be done in a home garage with hobbyist-level skill. This isn't science fiction. It's fact. (Need more proof? Just watch the last episode of "Breaking Bad.")

A variety of instructions, how-to videos and even off-the-shelf, trained AI software is readily available online that can be easily adapted to available weapons. Automated gun turrets used by hobbyists for paintball and airsoft guns have demonstrated the ability to hit more than 70 percent of moving targets.

To put that capability into perspective, the Army rifle qualification course requires a Soldier to hit only 58 percent of stationary targets to qualify as marksman on their weapon. Soldiers who hit 75 percent of stationary targets receive a sharpshooter qualification. It would only take some basic engineering, or enough tinkering, to build a heavier-duty turret with off-the-shelf software, a zoom camera and a fine control pan/tilt mechanism that holds a lethal firearm.

### AI FOR DECISION-MAKING

In the near term, AI is going to be used in military applications to aid decision-makers. The automotive industry is already integrating AI into vehicles to analyze driving situations and provide augmented reality to drivers via heads-up displays that can help avoid accidents.

Such systems work by judging the deceleration of nearby vehicles, analyzing the context of roadway markings, or using additional sensors to enhance navigation in low-visibility fog. Automakers have even integrated fail-safe technology that can brake the car to avoid collisions if the driver fails to act. This same type of technology will be deployed by the military to aid Soldiers' decision-making.

AI will be used to analyze the battlefield and provide augmented reality information to Soldiers via heads-up displays and weapon control systems. Such systems will be used to identify and classify threats, prioritize targets, and show the location of friendly troops and safe distances around them. Such systems will take information from multiple sensors across the battlefield to generate a picture based on information that Soldiers today would not even be aware of. Human Soldiers will still control the majority of military actions in the near term, but AI will provide easy-to-understand analysis and recommendations based on huge datasets that are too large for unaided humans to comprehend.

### AI IS EVERYWHERE

AI-based systems already permeate our daily lives. The list of the world's biggest companies is dominated by corporations that are built on or rely heavily on AI, such as Apple, Google, Microsoft, Amazon and Facebook. Amazon recently released Rekognition, a tool for image and video analysis that anyone can add to a software application. In fact, police are using the facial recognition software already.

The AI market was more than \$21 billion in 2018, and it is expected to grow almost nine times larger by 2025. AI systems provide predictive analysis to interpret human inputs, determine what we most likely want, and then provide us with highly relevant information.

AI is no longer a technology reserved for a handful of multimillion-dollar fighter jets. Advances in hardware technology provide cheaper, smaller, more powerful processors that can be integrated affordably into individual Soldier equipment and fielded by the hundreds of thousands. These advances in hardware are what enable the "internet of things," and what will become the internet of battlefield things.

The U.S. Army Combat Capabilities Development Command Armaments Center (CCDC) is developing smart weapon sights that can provide targeting information to aid riflemen and machine gunners. Soldiers will have an aiming display that

## A NEW NORMAL

As AI technology advances, so does the need for a serious discussion about the moral and ethical implications of it—one that considers current morals and ethics and accounts for how those societal norms will shift over time. (Image by Getty Images)



helps identify targets by classifying people in view as threats or nonthreats as well as indicating the relative location of “friendlies” and mission objectives.

Networking capabilities will further allow automated coordination to assign priority targets to individual Soldiers so that all targets are eliminated as efficiently as possible and time is not wasted by having multiple Soldiers engage the same target. Networked smart weapons will also allow logistics systems to automatically initiate resupply actions as soon as combat begins, providing just-in-time logistics all the way to the forward edge. Supply and transportation assets will be able to begin rerouting truckloads of supplies across the battlespace to the point of need. At the tactical level, small robots will be able to bring loaded magazines to individual Soldiers as their weapons reach the end of their basic combat load.

## TOUGH ETHICAL QUESTIONS

All the above is coming in the next 10 to 20 years. The technology exists, and it is simply a matter of time, development effort and cost-benefit ratios.

Even more automation is possible in the future. DOD and society at large will be faced with complex questions as this technology continues to grow. For example, it is already possible to include AI safety features that can prevent a weapon from firing at certain “wrong” targets—that is, not firing at targets the AI system does not classify as an “enemy”—to decrease collateral damage or to prevent enemy use of friendly weapons. This, however, raises a very interesting question: What does it mean for a weapon to be fail-safe? What error rate makes it “safe” for a weapon to potentially not fire when a Soldier pulls the trigger?

Some have raised concerns about increasing autonomy in weapon systems. Groups such as the Campaign to Ban Killer Robots and the International Committee for Robot Arms Control have

called for total bans on the research and development of autonomous weapons and for limiting AI research to civilian uses only.

Such calls for a ban on development of autonomous lethal weapons, however well-meaning, seem to ignore the fact that the technology they most seek to prevent (autonomous machines that indiscriminately kill humans) already exists. Autonomous armaments that can find and kill humans will appear on the battlefield, even if not introduced by the United States or another major state, because the required technology is already available.

The reason we do not see major armies deploying such systems is because of a lack of the ability to discriminate between legitimate and illegitimate targets. Research and development in this area is in its infancy and is intertwined with needed policy decisions about how to precisely define a legitimate military target. Stopping research into autonomous weapons now will not prevent “slaughterbots” that indiscriminately kill; it will only prevent responsible governments from developing systems that can differentiate legitimate military targets from noncombatants and protect innocent lives.

## WHAT ABOUT HUMAN ERROR?

We must consider the fact that humans make mistakes about using lethal weapons in combat. The U.S. bombing of the Doctors Without Borders hospital in Kunduz, Afghanistan, in October 2015 and the hundreds of thousands of civilian casualties in Iraq and Afghanistan attest to this reality.

We essentially still have the same “version 1.0” human that has existed for roughly 200,000 years, and capability development in humans is relatively flat. Our decision-making error rate in life-or-death situations is likely to be constant. Machine accuracy, on the other hand, is improving at an exponential rate. At some time in the future, machine accuracy at making combat-kill decisions will surpass human accuracy. When that occurs, it raises a host



### LOOPED IN

The author notes that the desire to keep humans in control combined with the current distrust in autonomous systems means that systems rolled out over the next 30 to 50 years will most likely continue to keep humans involved in operating them to some degree, similar to these semi-autonomous vehicles at Fort Bliss, Texas. (U.S. Army photo by Jerome Aliotta, CCDC Ground Vehicle Systems Center)



of interesting questions: Is it ethical to keep a human in the loop for weapon systems when a machine is less error-prone? Does the idea that only humans should be allowed to kill humans trump the desire to minimize civilian deaths? Are we willing to accept additional, avoidable deaths in order to keep humans in absolute control of lethal decisions? Is our human need to have someone to blame, someone to “hold accountable” and exact retribution from, more important than rational interest balancing that minimizes suffering?

This desire to keep humans in control and the current distrust in autonomous systems mean that the next systems to come in the mid-term, perhaps the next 30 to 50 years, will most likely continue to be semi-autonomous. The underlying technology will continue to improve, allowing human operators to place more and more trust in these systems.

Over time, we should expect the automated portions to become more capable and the human-machine interfaces to improve. This will enable human operators to increase their control over multiple systems while decreasing the level of detail the human has to control directly.

### CONTROLLING LETHALITY

Future semi-automated systems will evolve through three levels of human control over lethality. We currently operate at the first level, where every individual trigger pull to deploy a lethal weapon requires human approval.

At the second level, the person operating the weapon becomes more like a small-unit leader; the human decides when and where to open fire and the weapon then picks out individual targets and engages them. The human retains the ability to order a cease-fire.

The third and most abstract level is like a battalion-or-above commander exercising command and control. Here, the human decides on the mission parameters (such as left and right boundaries, movement corridors, desired outcomes, sequence of events or constraints), selects the engagement area, and designates weapon-control measures throughout the mission (e.g., firing only at identified enemies who have fired first while moving to the target area, firing at all targets not identified as friendly inside the engagement area boundaries, or not firing within 10 meters of friendly locations). The weapon system then executes the mission orders, finds and selects targets, and reacts within its parameters without further guidance as events unfold.

All three levels of control retain a human in the loop and allow humans to decide and define what a valid target is. Whether each level is deemed acceptable depends on how broadly we interpret the requirement to have a person selecting “specified target groups,” which is the language about semi-autonomous weapons used in current DOD policy.

Is it adequate to say that all persons in a designated geographic area are part of the specified target group? Does it matter that the human has direct observation of the targeted area to see and

decide that all persons in the area are legitimate combatants—and can cease fire if that changes? Is it enough to specify that anyone wearing an enemy uniform is part of the specified target group if sensors are capable enough at differentiating uniforms and clothing? How specific does the target description need to be, considering sensor and automation capabilities, to meet the standard for saying the human was in control?

### ATTITUDES AND GENERATIONS CHANGE

We should also consider how policy might evolve as society's confidence in AI increases. Current policies reflect the nascent state of current automated systems. Yet AI-based systems are improving and proliferating throughout society. Cameras no longer snap photos when we press the shutter-release button; rather, we trust the AI software to decide when everyone is smiling and record the best image. We have AI systems targeting us with individually tailored advertising. AI systems make million-dollar trades on stock exchanges throughout the world without human approval.

Our children are growing up in a world where they can ask an AI-powered device a question and not only get a correct answer, but the device recognizes them and addresses them by name when giving that answer. In only 20 years, some of these children will be the generals on the battlefield. In less than a generation, we should expect societal attitudes toward artificial intelligence to adjust to the demonstrated reliability that comes from improvement in the technology.

At what point does the human in the loop on a weapon system stop deciding whether a weapon should be used and start clicking the “approve” button *because* the AI sensor system assessed the proposed target as a threat? If a family court judge rejected the results of a DNA paternity test because he didn't think the child resembled the father, there would be shock in the courtroom, followed by a quick appeal. What happens when faith in the performance of a technology is high enough that disagreeing with what the system tells you becomes unthinkable? What happens when we reach the point where we court-martial weapon operators for placing friendly units at risk when they override weapon systems? At that point, why is the human part of the process and what role do they serve? Societal attitudes toward autonomous systems are going to change. It is highly likely we will eventually see fully autonomous weapons on the battlefield.

### CONCLUSION

The technologies that allow creation of AI weapon systems are inevitable, if not already existent. It is no longer possible to

prevent research unique to AI weapons while allowing research into helpful civilian applications to continue, because the remaining research areas are all dual-use. Furthermore, rudimentary but functional autonomous weapon systems can already be created with existing technology. The horse is out of the barn.

What we need to do now is have a serious discussion about the moral and ethical implications of AI technology. But it must be one that starts from the reality of the current state of technology, the capabilities that already exist, and recognizes that bad actors will misuse any technology in the future. We should consider not just our current morals and ethics, but also account for how society's norms will shift over time, as they always do.

What we do about the ethical and moral implications of AI will say a great deal to future generations about how we balanced rational and emotional concerns, and what kind of character and values we had.

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## DATA ARCHITECTURE

Elegant simplicity should characterize Army data collection and use. The author says simplicity is a sign of a well-understood problem. (Image by Busakorn Pongparnit/Getty Images)



# SO MUCH DATA, SO LITTLE TIME

Don't be fooled by powerful computers and fancy algorithms. You still must know what matters and how to measure it correctly.

*by Daniel E. Stimpson, Ph.D.*

**H**ave you ever wondered why Nigerian scammers tell people they're from Nigeria? Did you know this is simply their solution to a common big data problem also faced by many institutions, including the U.S. Army? But I'm getting ahead of myself.

These days we're hearing so much about big data, machine learning and artificial intelligence that it's becoming an article of faith that these hold the key to unlock every door. We're told that, with enough computing power, we can overcome virtually every obstacle in our path. But what has really changed about the fundamental enterprise of institutional learning and innovation? The fact is, not as much as you might think.

Data is just what we call the digits and symbols that represent information. It's the understanding of the underlying information that matters. Yet today more than ever, data masquerading as useful information can flood decision-makers. If it is not skillfully filtered and processed, voluminous data can give the impression of meaning, while much of the most relevant information is misplaced and obscured. In fact, there is nothing to be gained by an information deluge. Professor Alan Washburn of the Naval Postgraduate School said it this way: "Information is only useful to a decision process if a decision-maker has the power to use it to make smarter decisions." This remains true no matter how big the data gets and how flashy software becomes.



We must not confuse a computer's ability to win a game of chess or drive a car in formalized settings with human cognition. Gaming and driving are impressive programming accomplishments, but they don't require any true intelligence, understanding or thinking from the computer. The computer is only processing 1s and 0s. That's it. It has no "understanding" of anything it is doing, why it matters, or what makes one set of 1s and 0s more important than another. The computer simply processes the digits it is given, exactly how it is instructed to. It never wonders why, gets bored, or has a sudden insight. The program designer is doing all the thinking, making all the value judgments, and deciding if any of the 1s and 0s being produced have meaning or worth. There's nothing our modern computer science mystics have done to change this.

The challenge of quickly amassing useful information is not new. Long before the present big data mania, 19th-century theorist Carl von Clausewitz, in his 1873 book "On War," described a pervasive characteristic of war as a "fog" of uncertainty in which a military force must operate. However, it's not just the operational military that lacks useful information when it is needed and must take action under uncertainty. This condition characterizes every aggressive, forward-thinking organization engaged in ambitious undertakings.

### GOLDBLOCKS DATA

During a lecture at the University of Virginia in the 1960s, Nobel Prize-winning economist Ronald Coase said, "If you torture the data long enough, nature will always confess." This remains a central concern of the big data revolution. Employing powerful computers to churn through mountains of data does not guarantee increased insight. The basic rules of research still apply: We must begin with a question and be clear about what we are trying

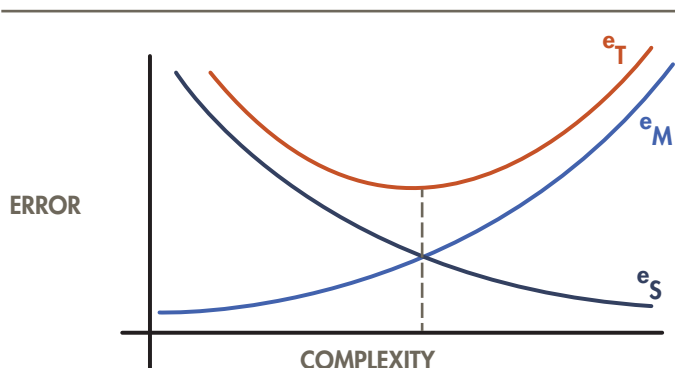
to accomplish. Otherwise, we can become lost in the data mountains, following the computer on a digital path to nowhere, in a high-tech version of the blind leading the blind.

"Garbage in, garbage out" (GIGO) expresses the fundamental principle that computer algorithms can only produce results as good as the data that feeds them. The simple fact is that no algorithm can create quality information from garbage data. And increasing the quantity of such data doesn't improve matters.

The sheer volume of data that computers can process today makes the GIGO problem increasingly acute. In 1979, David Leinweber of the RAND Corp. prepared a note for the U.S. Department of Energy that illustrates this principle clearly and succinctly. (See Figure 1.) His hand-drawn chart, published before the advent of computer graphics, demonstrates the inescapable trade-off between increasing model complexity (called model specificity (S)) and measurement error (M) in mathematical models. Leinweber's chart shows how increasing model complexity can increase a model's explanatory power by reducing unexplained variation or mathematical error (eS). But Leinweber's illustration also shows that this comes at a price. It turns out that, the more calculations we do on imprecise measurements, the more the measurement error (eM) is compounded. This is shown by the eM line rising from left to right.

It is also important to understand that, even if we can attain perfect data, model error can increase with model size and complexity as the result of a wide range of distorting influences. For example, even with today's high-powered computers, many important problems remain too large to ever solve or at least take too long to solve in the available time, so solutions can only be approximated by a sequence of mathematical shortcuts. This

FIGURE 1



### MODEL ERROR

Leinweber's model-error illustration shows that the minimum total model error results from the trade-off between decreasing model error (eS) from increasing model specificity (eT) and measurement error from increased computation on imperfect data (eM). (SOURCE: "Models, Complexity, and Error. A RAND Note prepared for the U.S. Department of Energy," by David Leinweber, 1979)



### THE INFINITE COAST PARADOX

The length of Great Britain's coast might appear finite. But, according to the infinite coast paradox, the more closely you measure the details of the coast-line, the longer it gets, illustrating the author's point that more information doesn't always improve understanding. (Image by Louis16/Getty Images)

difficulty becomes greatly exaggerated when complex mathematics are performed on sparse or inaccurate data.

Taken together, we see the inherent trade-off between more and less data, and greater and lesser specification in calculations. Just as Goldilocks found, there is a place where models and data usage are not too hot and not too cold. Importantly, observe that the best model is somewhere well short of maximizing either the data usage or the model complexity.

This demonstrates Leinweber's contention that the only valid reason to add more data and complexity to a mathematical model is to increase the accuracy of its result. In practice, getting this right requires domain knowledge and mathematical skill, not just the latest software package. And getting the model right matters greatly. As Leinweber wrote, "Important policy decisions should not be based on noise." Depending on the data in question, there may be so much noise that reliable inferences are impossible.

In his book "Antifragile," scholar and statistician Nassim Nicholas Taleb more recently said it this way: "As we acquire more data, we have the ability to find many, many more statistically significant correlations. Most of these correlations are spurious and deceive us when we're trying to understand a situation. Falsity

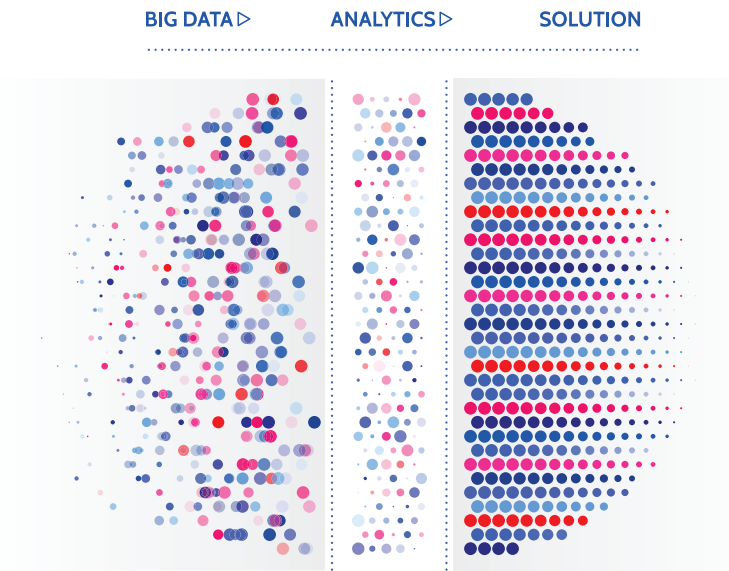
grows exponentially the more data we collect. The haystack gets bigger, but the needle we are looking for is still buried deep inside."

According to John P.A. Ioannidis, professor of medicine and health research at Stanford University, in his paper "Why Most Published Research Findings are False," this concern is not just theoretical: "There is increasing concern that in modern [medical] research, false findings may be the majority or even the vast majority of published research claims." Further, according to a 2016 survey by the premier science journal, *Nature*, 52 percent of researchers believe there is a "significant crisis" because the majority of published findings in many research fields cannot be duplicated. Only 3 percent stated there was no crisis at all. So before you seek the help of supercomputers and modern analytics, pay close attention to the quality of your information and the complexity of your approach.

### ALWAYS CHOOSE QUALITY OVER QUANTITY

Computer science has now entered the Zettabyte Era. A zettabyte is a measure of digital information equaling 1021 (or 1,000 billion billion) bytes. According to Cisco Systems, global data volume exceeded one zettabyte in 2012 and internet traffic exceeded one zettabyte in 2016.





### BIG DATA

Flashy software and more data may not be what is needed to improve decision support. (Image by ArtHead/Getty Images)

For a sense of how large this is, it has been estimated that printing one zettabyte in book form would require paper amounting to three times the trees on the Earth today. By 2020, the world data quantity is expected to be over 40 zettabytes. This is a truly staggering number. According to the National Oceanographic and Atmospheric Administration, 4.5 zettabytes is about equal to the number of ounces of water in all the world's oceans.

Still, reliable information is the lifeblood of any process of understanding. In fact, in our information age, high-quality data should be thought of as a strategic asset and a force multiplier. But, as the late David A. Schum wrote in "The Evidential Foundations of Probabilistic Reasoning," our current methods for gathering, storing, retrieving and transmitting information far exceed in number and effectiveness our methods for putting it to use and drawing conclusions. And modern machine learning, in many cases, can make this problem worse by finding unimportant correlations that can distract from the real issue being addressed.

Carpenters teach an important lesson about the importance of having good information before taking action: "Measure twice; cut once." The same is true of any data collection effort. But good data is often much harder to obtain than we might expect.

Frequently, the necessary data is never recorded when it could have been, or it's recorded for a different purpose or without the care and precision necessary for the current problem. While there are myriad potential obstacles to attaining reliable information, here are a few of the most common missteps:

- Taking inexact measurements.
- Using improper and inconsistent collection procedures.
- Inaccurate data recording and retrieval.
- Measuring the wrong things.
- Poor data management, access and security.
- Information hiding (dishonesty and fraud).

Good data collection requires planning, dedicated effort and long-term care to avoid all these sources of error. With limited resources, this is a management effort that requires setting clear priorities and leadership because we can't collect quality data on everything. Rather, we need to carefully focus on what we really need to know. Best-selling novelist W. Bruce Cameron wrote, "Not everything that can be counted counts. Not everything that counts can be counted." This reminds us to focus on meaningful, accurate measurement of our objectives, not measurement for measurement's sake.

The importance of sober thought about the effort required to satisfy data requirements is a major theme in Thomas Sowell's landmark book, "Knowledge and Decisions." Sowell, an economist and social theorist, points out that, most of the time, we grossly underestimate the cost of the information collection required to make informed, top-down decisions in complex environments. Consequently, the extent to which the processes we design require detailed information is an important concern that deserves significant resources and effort upfront rather than being assumed away, leading to cost overruns or disappointing results later. Unfortunately this occurs all too often.

A great practical example of the principle of proper focus comes from Cormac Herley. He asked, "Why do Nigerian scammers say they are from Nigeria?" His counterintuitive insight is that criminals have a big data problem just like the rest of us. For them, finding gullible victims is a "needles in a haystack" problem. Why? Because the number of people receptive to their scam is small. Like the rest of us, crooks have limited time and energy, and they need to quickly filter out the vast number of people who are unlikely to give up their money to focus on those who most likely will. Otherwise, they will spend too much time on the hard targets and never get to the soft ones. By making themselves very obvious, they filter out all but the easiest victims, i.e.,

those who don't question why someone from Nigeria needs their help. This enables them to concentrate their limited time and energy on the most trusting, highest-payoff population.

Just like Nigerian scammers, those facing a large, complex problem can't afford to focus their limited time and resources on noise or fruitless pursuits. They must learn how to carefully discriminate and sift through the mountains of potential data to find the information that matters most. So, before you hire that whiz kid with the machine-learning algorithms, get your information collection process straight.

### KISS ALL YOU CAN

Occam's razor is a philosophical principle from the 14th century that is just as true today as ever. In short, it states that when there are two or more explanations with equal explanatory power, the simpler one is preferred. Alternately, it can be expressed this way: The more assumptions an explanation requires, the more likely it is to be false. It's really just a sophisticated version of the popular idiom "keep it simple, stupid," or KISS.

This is not to say everything is simple. Rather, just as it was seven centuries ago, the right amount of simplification is critical to our ability to construct accurate models of reality and solve meaningful problems. Again, this is shown by Leinweber's eT line in Figure 1.

There are many examples of simple models outperforming complex ones in this digital age. Take two provided by Nobel laureate Daniel Kahneman, who points out that predicting marriage stability does not require complicated measures of people's psychology, finances, religion or myriad other considerations. Rather, a simple formula actually can work much better.

It turns out that if we simply sum the frequency of lovemaking and subtract the frequency of quarrels between a husband and wife, we have an excellent predictor of the long-term prospects of their relationship. If this number is positive, they are in good shape, while a negative number spells trouble. Kahneman also offers the example of a model for predicting the value of highly collectible, expensive Bordeaux wines. Here, a very simple model with just three variables (summer temperature, previous winter rainfall, and rainfall during harvest) predicts a wine's value with 90 percent accuracy across a horizon of multiple decades.

Don't be mistaken; simple models that work are not generally simple to develop. They require thorough understanding of the often complex phenomena being represented. In other words, someone has to do the hard work of figuring out what matters most among everything under consideration. Then, they have to figure out how to measure correctly. Until these occur, no model, whether simple or complex, is likely to help. Here, every leader should take note. In most cases, being unable to assemble a straightforward model of your problem is a strong indicator that you don't fully understand what exactly you are trying to solve.

### CONCLUSION

Remember, too much information is as bad as too little. Big data analytics can open the aperture so we see more than ever before. They can challenge our paradigms and reveal things previously hidden from us. But this depends on the accuracy and precision of the information we feed our algorithms. If done well, combining great computer power with vast data provides great opportunities. If done poorly, it can lead to enormous confusion and spectacular mistakes.

So, when the data miners come knocking, remember you need to already have intimate understanding of the problem you are trying to solve and you must have already recorded reliable information. Only then should you release them to begin work. Also remember that the powers of technology are not magical solutions to solve every ill. They are just one of many tools available to address complex problems. So stay humble, stay in charge, and don't be easily dazzled.

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### ONLY CONNECT

The Project Manager (PM) for Tactical Network, part of the Program Executive Office for Command, Control and Communications – Tactical (PEO C3T), equipped the first unit the 3rd Brigade Combat Team, 82nd Airborne Division in February with the new inflatable satellite communications system known as Transportable Tactical Command Communications. Tools must work intuitively for the Soldier, or they will never make it to the fight. (U.S. Army photo by Amy Walker, PM Tactical Network/PEO C3T)

# ARCHITECTURE FOR ARMY MODERNIZATION

To reach its goal of an acquisition ‘renaissance,’ the Army must create an architecture for modernization that provides a blueprint for how all of the pieces fit and work together.

*by Nickee Abbott and Richard Haberlin, Ph.D., Cmdr., USN (Ret.)*

Preparing for conflict requires the Army to modernize not only how it organizes, trains and equips the force, but also how it makes decisions. The Army budget narrative, in which it lays out its rationale for the funding it requests of Congress, calls for “a bold change—a renaissance—across the Army.” To achieve that renaissance by 2028, the Army has to field the next generation of combat systems, write new doctrine for the optimized use of those systems and reorganize the service into the formations that will fight with them. Developing the new systems will require continuous, iterative interaction among all of Army acquisition’s stakeholders. Engineering them will require architecture, analysis and experimentation.

The Army’s newly established cross-functional teams each focus on assigned modernization initiatives, leading to improvements in key capabilities. Unfortunately, the mechanism to ensure that these improvements achieve the intended synergy in practical operation is immature. Capabilities must work together in a seamless and intuitive Soldier experience, or they will never make it to the fight. Senior leaders have acknowledged that current processes and tools suffer from three critical flaws:

- The requirements development and refinement process does not execute at the speed necessary to meet the Army’s goals. It often takes years to generate requirements.
- The requirements development process does not clearly align to Soldier needs when integrated across the capability portfolios. Capabilities that increase Soldier burden will be abandoned.
- The analysis of performance is not clearly aligned to support acquisition decisions. Analysis often comes too late to help decision-makers or represents only the best and most ideal use cases.

In a recent example, the Air and Missile Defense Cross-Functional Team developed the Mobile Short-Range Air Defense system to fit an immediate need for maneuver units to identify and counter air threats quickly and effectively. However, the solution design does not include requirements for integration with the existing defensive and offensive fire control systems: the Integrated Fire Control Network or the Advanced Field Artillery Tactical Data System. The operational benefit of an integrated solution was lost during requirements generation.

## SOLUTION

To achieve a modernization renaissance, the Army needs to address the three critical flaws in the acquisition process. The best way to address them is a robust architecture development process. Architecture, like a blueprint for a building, serves as a planning guide for system development. In the same way that a blueprint indicates where walls should connect but does not define what color they are painted, the architecture should be



specific enough to keep system development on track, but still allow for innovation and creativity. An architecture grounded in consistent, authoritative data and that clearly defines how systems work together will hasten the requirements generation process, stimulate integration across portfolio boundaries and align analysis with decision-making.

A modernized approach to Army architecture starts with capturing individual system requirements from cross-functional teams during concept and capability development. Then, with participation from stakeholders in the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT)) and the U.S. Army Futures Command, the approach must identify cross-portfolio and enterprise requirements. The architecture solution must include a digital implementation where all data is stored in an authoritative repository and accessible across the enterprise. (See Figure 1, Page 132.) This “capture once, use many times” construct streamlines processes, reduces errors and establishes a common baseline for prototyping, experimentation, analysis and materiel development.

## WHAT IS ARCHITECTURE?

In its simplest form, architecture is the visual depiction of a complex system documenting its components, connections and functions. The architecture process can be used as a management tool, a blueprint for cross-functional teams to follow while conducting system development. Architecture can also be a communication tool to express complex logic, hierarchies and interfaces to stakeholders of varying technical prowess. Additionally, architecture can serve as a justification tool, useful for understanding decisions and confirming assumptions early in the system development process. Through the use of a common data repository, all architectures can be consistent and traceable from concept to deployment. Finally and most importantly, architecture shows how systems are interdependent and interconnected, and how they are working synergistically toward operational goals.

As the blueprint for Army modernization, architecture enables transformation of business processes and integration of systems across the enterprise to minimize duplicative capabilities and maximize interoperability. Through the architecture process, Army acquisition will realize significant benefits as a well-managed federation of systems. Architecture enables the integration of systems-of-systems within portfolios, often referred to as vertical integration, and across portfolios (horizontal integration) through standardization of methodologies and lexicons and better understanding of external interfaces.

Architecture ensures effective and efficient processes, systems, services and resource allocation through the capture and reuse of enterprise knowledge. It supports the collaborative engagement of ASA(ALT), Army Futures Command and all other acquisition stakeholders by providing templates for views to support decisions. Consumer and producer roles for collecting data and developing these views should be aligned to established positions and responsibilities.

DOD has defined a set of standardized architecture views, a mixture of pictorial diagrams, matrices and lists, known as the DOD Architecture Framework. Within the DOD Architecture Framework, capability views (defining the abstract system capabilities) and operational views (detailing activities and tasks the systems might accomplish) align to the Futures Command through the concept development and requirements definition processes. Systems views, describing physical components, align to ASA(ALT) through the systems engineering processes of program executive offices and program management offices. Standards views, containing the rules, policies and guidance systems, must adhere to, are established and are maintained by the Office of the Army Chief Information Officer/G-6. When assembled, all of these views become an integrated architecture model.

## ARCHITECTURE AS AN ENABLER

Making approved capability views and operational views available early in the development cycle allows for timely identification of capability gaps and operational needs. Operational requirements can then be derived from these products. System views of existing and legacy products are a source for performance requirements, which are particularly important when one system needs to be integrated into another larger system (e.g., a new radio for a vehicle). Standards views serve to identify relevant standards that, when followed, should address interoperability requirements.

For example, an operational view of a new ground combat vehicle clearly depicts how it is used to defeat bunkers and armored vehicles. At the same time, the operational view also clearly depicts capabilities the vehicle will not have. Stakeholders will know by looking at the operational view—which could be a diagram, a flow chart, a matrix, a table of activities, etc.—that the new vehicle is not intended to defeat enemy tanks or be submersible. A system view of all the command-and-control systems that will be integrated into the new vehicle defines size and weight requirements for the vehicle. The standards view prescribes that the power bus on the new vehicle have a certain voltage so that all the equipment integrated will work properly. Architecture views developed early in the system development process reduce

uncertainty and re-engineering while increasing common understanding for stakeholders.

When the development and maintenance of these architecture products are managed by the acquisition stakeholder community in an upfront plan, requirements generation can follow a documented process from initial concept to prototype. The architectures can be used to communicate operational goals and system constraints between disparate groups. Decisions made or not made in system development can be adjudicated in terms of the architecture. Program managers can consult the architecture to check if a capability, operation or component is affected by a decision to add or remove a function from a system. Second- and third-order effects that are not obvious in stovepiped system development can be easily identified when the system is placed in the larger system-of-systems or enterprise architecture.

### ARCHITECTURE AS A PROVIDER

Leveraging the data stored in an architecture model provides several benefits. First, it links concepts to capabilities to solutions and provides operational context, processes, activities and requirements. This end-to-end traceability ensures that the developed system remains focused on

Soldiers' needs. Architecture defines the standards for implementation necessary to field an interoperable system. Setting standards not only ensures interoperability with existing systems, but it also creates more opportunity for development of future capabilities that may be integrated, by setting expectations and enabling modular integration.

A linkage from concept to capability to solution ensures that a Soldier's needs continue to be met in increasingly complex systems through simplified configuration management. The ability to trace architectures from concept view to system view ensures that cross-portfolio requirements are identified and not ignored or casually traded away later in the development process. A standardized architecture methodology and diagram set allows different stakeholders to communicate their interests and concerns across portfolio boundaries in a language that can be universally understood. The architect is able to capture the warfighter's requirements and translate them into the language of the materiel developer. Traceability works in both directions, giving materiel developers insight into how a particular requirement meets warfighter needs, and showing the warfighter why a particular materiel solution was chosen given the cost, schedule

and performance constraints that the materiel developer must adhere to. This makes it easier to understand the decisions made by all parties in the Army's modernization process.

### ARCHITECTURE AS A VALIDATOR

Through the requirements generation process, architecture captures and defines system attributes and provides a basis for comparing system performance against operational requirements. Architecture may be used to link analysis with early experimentation using the operational requirements, system attributes and underlying data stored in the architecture model. Prototyping, experimentation and analyses, via modeling and simulation, will help refine requirements and help set the threshold and objective specifications for materiel development. High-fidelity models and complex scenarios are challenging enough to build and maintain without analysts spending time combing stakeholders' repositories for data—much of which is unusable because it is incomplete, has dissimilar formats or accounts only for inter-portfolio connections.

An architecture model can be referenced for standardized performance, integration and interoperability requirements that can be analyzed before the evaluation

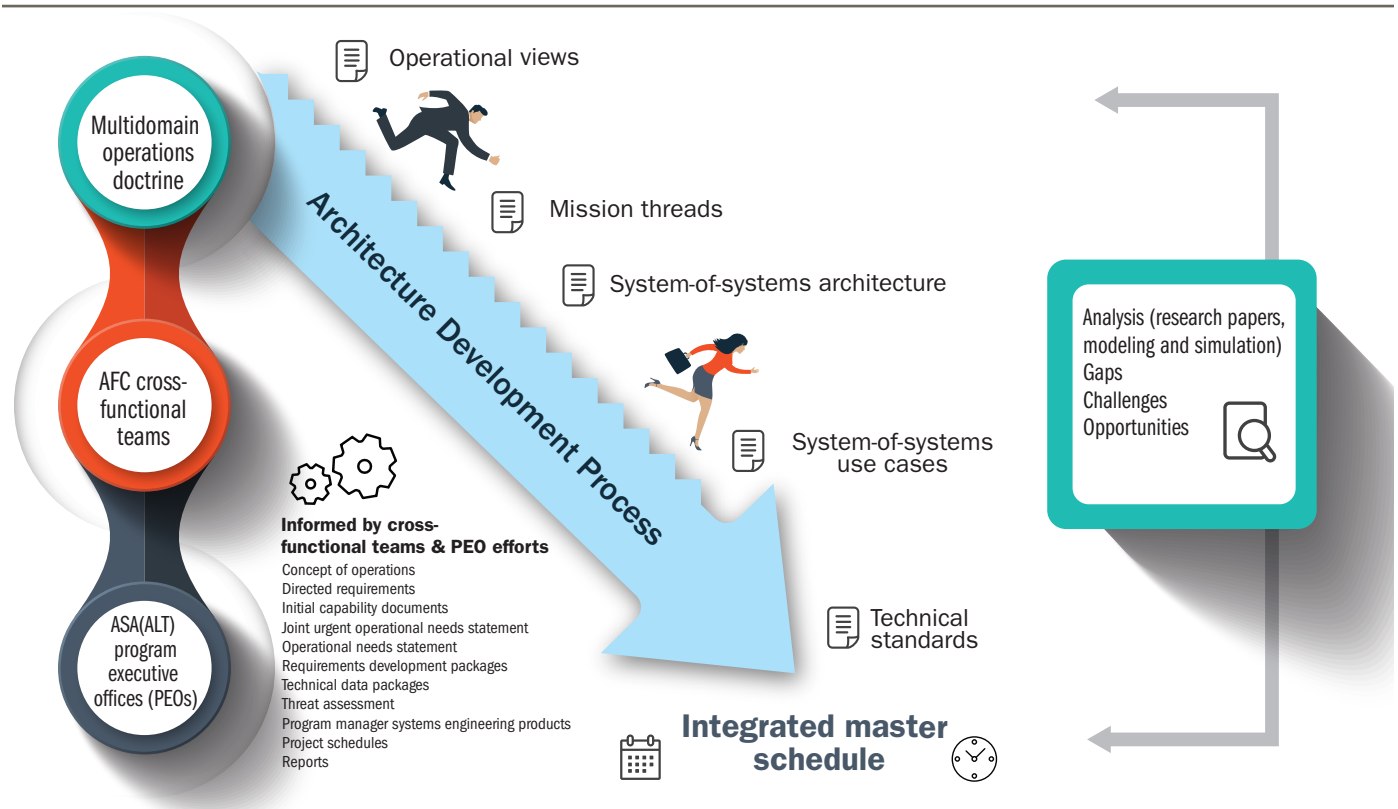
### TEST FIRE

The Army fires a Patriot missile in a recent test. A system recently developed by the Air and Missile Defense Cross-Functional Team to fit an immediate need for maneuver units to identify and counter air threats quickly and effectively didn't include requirements for integration with existing offensive fire control systems. (U.S. Army photo)





FIGURE 1



## ARCHITECTURE METHODOLOGY

A modernized approach to Army architecture begins with system requirements from the cross-functional teams. Then, cross-portfolio and enterprise requirements are identified by stakeholders in ASA(ALT) and the Army Futures Command. The final architecture must include data storage that is accessible across the enterprise. (SOURCE: ASA(ALT) Office of the Chief Systems Engineer)

of alternate solutions. The availability of an architecture model would accelerate expected system performance analyses, increasing the chances that they would be completed in time to inform acquisition decisions, often not the case in acquisition today.

With a single, authoritative architecture model, analysis can be better managed to support acquisition decision-making. Model fidelity and scenario development will take precedence over data gathering and corroboration. With a clearer understanding of the architecture, decision-makers will be better able to direct analysis efforts to be more refined and better answer difficult questions before making a potentially irreversible acquisition decision. Analysts will be able to use the architecture to further improve model and scenario fidelity as they can quickly and efficiently communicate in a common language with both operational requirements owners and materiel developers. With clear, relevant, high-fidelity model data

in hand, decision-makers will have the justification to defend their acquisition decisions.

## ARCHITECTURE IN A DIGITAL WORLD

For an architecture to be successful in a highly connected, digital enterprise, it must include all stakeholders, be readily accessible and be easy to navigate from concept to deployment. A digital architecture model has the additional role of being the authoritative repository for all data pertaining to solutions under development and their integration with other systems. This repository becomes the single launch point for analyses performed on the system, providing a consistent data source for modeling and simulation tools to link directly into.

In this way, the repository serves as a mechanism to manage configuration of the current state of the enterprise and an enabler for analyses of future designs. Reusing system data stored in an

authoritative digital repository establishes a common baseline for various solutions under development. Mapping solutions to the common baseline provides the justification for analyses of expected performance of alternative solutions. Analysts will be able to clearly point to how their work supports the acquisition decision-making process. In the same way, the common baseline simplifies future integration of additional components as technologies mature. Common baselines enable “plug and play” solutions to be developed, instead of designing a system from the bottom up whenever a new function needs to be added.

Using data from the architecture model, context- and decision-specific views, outside of the standard set of DOD Architecture Framework views, could be customized for specific discussions and decisions. Creating unique views from the same underlying data ensures consistency across the enterprise. Through this data repository, enterprise knowledge can be captured efficiently and made available for reuse. Reuse may include new collaborative communications between portfolios, or new and innovative analyses.

### HORIZONTAL INTEGRATION STUDY

As a recent example, the Army Futures Command implemented a horizontal integration “tiger team” to document first-order expected interdependencies—systems or functions that rely on other systems to work properly—between the cross-functional teams’ systems. The team developed an architecture methodology to capture these interdependencies from both an operational and system perspective. Recognized interdependencies for this effort included communications; networking position, navigation and timing; synthetic training; power distribution and generation; sustainment; interoperability; autonomy; and commonality of sensors and subsystems.

The team used the architecture methodology developed during the study to inform subsequent analyses, modeling and simulation, course-of-action development and near-term resourcing decisions for senior acquisition leaders. This architecture methodology was recognized by Army Futures Command leadership as valuable—so much so that it was approved for inclusion in their Future Force Modernization Enterprise requirements documentation.

### CONCLUSION

In a January 2018 interview with Defense News, Army Secretary Dr. Mark T. Esper summed up the role of architecture by noting that “the key, or part of the key going forward, has to be to understand the architecture and to map it out so we have

the plan. ... It’s like building a house—you have to have a blueprint. Having a blueprint doesn’t necessarily mean deciding who will supply the fixtures or materials or what will be used, but it defines what is needed.”

Architecture supports the identification and documentation of system interdependencies with technical rigor; frames and quantifies opportunities for resolution; and enables informed decision-making. As a living product, architecture supports timely requirements development and updates in the face of new systems and emerging threats. Architecture ensures the end-to-end traceability of requirements to solution as a system goes through concept, requirement generation and deployment. The architecture confirms that a Soldier’s equipment aligns to an initial need for that equipment. Finally, architectures support comprehensive analyses to refine operational concepts and system solutions, and can serve as blueprints for force modernization.

*For more information, contact Fred Buchanan in ASA(ALT)’s Office of the Chief Systems Engineer at [fred.b.buchanan.civ@mail.mil](mailto:fred.b.buchanan.civ@mail.mil).*

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*RICHARD HABERLIN, Ph.D., Cmdr., U.S. Navy (Ret.), is senior technical adviser in the Modeling, Simulation, Experimentation and Analysis Division at MITRE Corp. He leverages 20 years of Navy operational and staff experience to produce tailored, relevant and defensible analyses informing executive-level decisions across DOD and the broader government. He earned his doctorate in systems engineering and operations research at George Mason University, and holds an M.S. in operations research from the Naval Postgraduate School and a B.S. in ocean engineering from the United States Naval Academy.*



# BRING YOUR DATA



| We have to know what we know,  
not what we think we know.

Above the door to my office is this expression:

“IN GOD WE TRUST—EVERYONE ELSE BRING DATA.”

I didn't come up with this idea, but I use it a lot. When it comes to talent management and workforce management, one of the biggest challenges we face in the way of data is that we don't necessarily have a robust data system for talent management. We have historically collected a lot of demographic data. We know the types of degrees our workforce has, the schools they've attended, the training they've achieved and their work experiences. But we aren't collecting and capturing much data on competencies. That's why we tend to do studies and assessments of competencies and skill sets to understand where our skill gaps are and may be in the future.

## DO WE HAVE THE RIGHT DATA?

Which raises a question: Have we collected the data we need on the talents of the Army Acquisition Workforce (AAW)? Do we just need to analyze it more completely? Or do we need more data in order to build a better AAW? The answer is D, all of the above.

Obviously, analyzing the data we have is an important aspect of making smart decisions. Too often, people overlook the importance of “knowing what you know” and rely instead on what they think they know. The only way to get people on the same page

and heading in the right direction is to have valid, verifiable data that says, “This is why we know what we know.” Otherwise, strategic decisions are likely to be based on gut instinct or opinion. And when strategic decisions are based on gut instinct or opinion, there's no way to defend them to somebody who suggests that a particular choice is not the right one. That's why I'll say it again:

We have to know what we know, not what we think we know.

However, in many cases we don't have the capacity or access to collect the data we may need. Then we're stuck doing our best to make inferences when the actual information is too hard to get, unavailable or too expensive to gather.

## PUTTING DATA TO WORK

In a perfect world, everyone would have enough time built into their work schedule—and I know that is a very challenging statement—to use something like the Acquisition Workforce Qualification Initiative system to capture competencies. There's a big difference between the skill sets of a contracting professional who does work in supporting contingency operations and those of one who works in acquiring weapon systems. But when

FIGURE 1: ALL ARMY ACQUISITION WORKFORCE MEMBERS

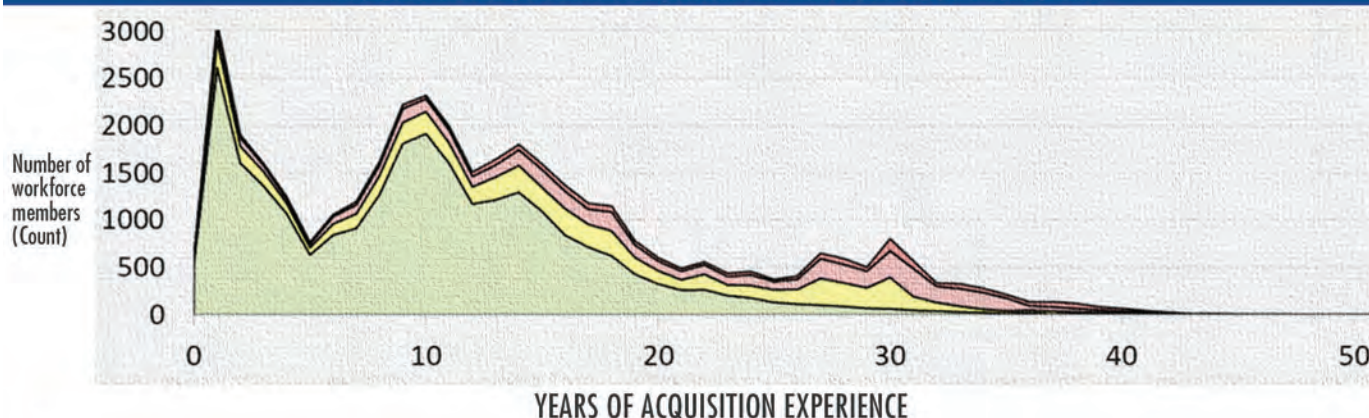


FIGURE 2: CONTRACTING CAREER FIELD

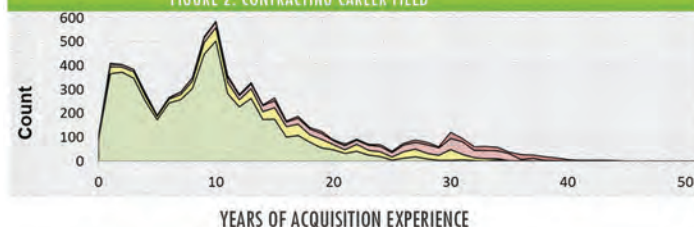
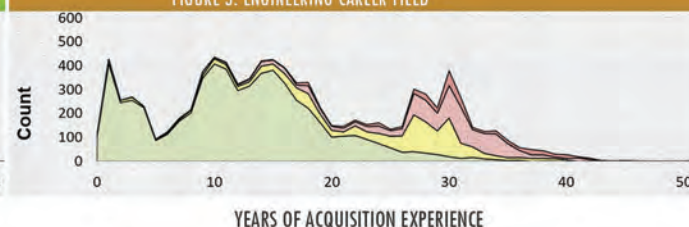


FIGURE 3: ENGINEERING CAREER FIELD



**KEY** ■ Eligible for retirement in five years or more ■ Currently eligible for retirement ■ Eligible for retirement in less than five years ■ All Army Acquisition Workforce

### DATA TELL A (PARTIAL) STORY

These graphs are a snapshot of three different groups in the Army Acquisition Workforce—the AAW as a whole, the contracting workforce and the engineering community—specifically, their years of experience. What does the data show? That, for example, engineers tend to stay in their jobs longer, and that many are eligible for retirement or nearing it. But it's equally important to see what the data does not show—local trends, for example, or competencies—and pursue better data to support talent management. (Graphic by U.S. Army Acquisition Support Center)

they get their experience and they have the same amount of time and training, they both get the same certification in contracting.

Currently an organization or potential employer can't see the differences without culling resumes and conducting interviews. There's no big pool within a management information system that says, "Oh, here are the people who know how to do this, have a particular competency or possess a specific skill set."

There are a number of places where we need to drill down and get that second-level, third-level and fourth-level information.

### THINK GLOBALLY, ACT LOCALLY

What's the old adage? You can use data to tell any story you want.

If we look at the workforce in the aggregate, it might seem to have unique characteristics. But if we drill down and only look at the engineering community, for example, we might find something very different. For example, take a look at Figure 1. It shows the aggregate AAW with respect to years of experience. Then look at Figure 2, which shows the years of experience for the contracting community. It generally looks the same as Figure 1. Figure 3 shows the engineering community. Engineers tend to stay in



their jobs longer, and many are either eligible for retirement or nearing it.

What's happening across the acquisition workforce is not necessarily happening to the engineering community. And if we break that down even further—maybe what's happening at one of our centers of gravity like Aberdeen versus Huntsville—sometimes it's different from the engineering community at large. You really have to think globally and act locally.

We in the Office of the Director for Acquisition Career Management and the U.S. Army Acquisition Support Center are trying, to the best of our ability, to work with those communities to allow them to help themselves. We are hardworking and dedicated, but we can't figure out why, as an example, organization X doesn't have the right skill set or competency for artificial intelligence. We need that organization to step up when a problem arises; there's currently no way for us to drill down to see if that's possible. If they see that the problem is caused by a broader issue at the aggregate level, then we here at the Acquisition Support Center can try to help address that through a number of our programs.

But at the local level, we need them to bring that problem forward so we can try to help solve it. It might mean sending somebody to school. It might be developing a local training program. It might be using the Defense Acquisition Workforce Development Fund to hire an intern. There are lots of ways that we can assist.

We have good processes to evaluate and analyze their data, but we don't typically *have* their data. We don't have their insights or knowledge as to what's going on. For as much effort as we put into strategic communications, I'm still constantly finding somebody who is surprised to learn that we can help them with an issue. Because the information we put out is abundant. It's pervasive. It's there for anybody who's looking for it. Our website, **asc.army.mil**, is one-stop shopping. Almost everything that you could possibly need to know is there.

## CONCLUSION

It would be great if everybody had the time in their day to capture all the things that they're doing to manage their talent and the lessons that they've learned, and write them down. But every day brings the next emerging challenge. It's not because people don't want to manage their talent or that they're not dedicated to doing it. But everyone is constantly facing new challenges; it's a matter of how you prioritize your time and effort.

But when you can take some time and put some thought into writing down what you've learned—about competency shortfalls, talent management, prioritizing lessons learned—so that we can populate a number of data sources, it helps everyone, not just you but all those around you. And the people who come behind you.



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# A CHANCE TO THINK

Naval Postgraduate School lecturer takes case studies on the road to offer the acquisition workforce a rare immersive opportunity.

*by Michael Bold*

Defense acquisition is a complex, painstaking and constantly evolving enterprise, and that's not going to change. That's why Dr. Bob Mortlock, a professor of the practice at the Naval Postgraduate School (NPS), developed a one-day seminar that he's offering to program executive offices to give defense acquisition workforce members "a chance to step back and take a day to think about the business we're in."

"It's so big, it's so complex, it's so incredibly engaging, but oftentimes we don't take the time to just think about things—to think about the business of acquisition," he told Army AL&T in April.

Mortlock, who retired as a colonel after a 27-year career in the Army (the last 15 in acquisition), now teaches defense acquisition and program management in the Graduate School of Business and Public Policy at NPS in Monterey, California. He took his classroom on the road in February and March to the Program Executive Office (PEO) for Ground Combat Systems (GCS) in Warren, Michigan; the PEO for Simulation, Training and Instrumentation (STRI) in Orlando, Florida; and the PEO for Enterprise Information Systems (EIS) at Fort Belvoir, Virginia.

The PEOs supply the students and a room to meet in, and NPS supplies the funding and the course materials. Mortlock provides the leadership and the passion.





## LEARNING IN PROGRESS

The class at PEO EIS at Fort Belvoir works on a problem. (Photos courtesy of Dr. Robert F. Mortlock)



## MORE PERSPECTIVES, BETTER UNDERSTANDING

Mortlock, at left, with his class at PEO GCS. Judith A. Gachupin, strategic planner at PEO GCS, said the class helped her see how the acquisition system has changed over the years.

## EVERYONE BENEFITS

“When you offer things to folks, often the reaction is, ‘Argh, what do you want? What’s your motive here?’ I don’t have a motive other than sharing case studies with the larger workforce.”

That passion for acquisition—providing lessons learned and best practices, passing on knowledge so that the same wheel is not reinvented endlessly—has made Mortlock a frequent contributor to Army AL&T’s “Been There, Done That” commentary series, which he helped to develop.

“What I get out of it is I stay in touch with the civilian acquisition workforce,” he said. “So I learn things out of this as well. It’s not like I’m completely selfless here. What I get out of it is a connection to the folks that are in the trenches still.”

Most graduate-level classes use case-study learning because it involves students in real-world situations through an experiential approach, Mortlock said: Students can place themselves in the case as the “protagonist,” ask themselves what they would do and justify their recommendations based on facts presented in the case. Defense Acquisition University’s PMT 401 Program Manager’s Course, which involves hundreds of case studies, was “one of the best courses at DAU that I went through,” he said.

## LARGER THEMES

To stimulate thinking about acquisition, Mortlock uses two case studies:

- The rapid developing, testing and fielding of the Enhanced Combat Helmet (ECH). The ECH had to address the rifle threat, be fielded as quickly as possible, and reduce the weight on Soldiers and Marines in combat. It was fielded despite objections from the testing and medical communities. Mortlock



### CASE STUDIES TO GO

Mortlock, at left, with his class at PEO STRI, uses case studies that can teach multiple points about the practice of acquisition.

uses the ECH case study to illustrate the pitfalls of focusing on speed above all else.

- The incremental development and evolutionary acquisition of the Joint Common Missile, a joint Army, Navy and Marine Corps effort initiated in the late 1990s to replace HELLFIRE, Maverick and aviation-launched TOW missiles fired from aircraft. The program successfully reached milestone B in early 2005 but was canceled later that year, only to be followed by the Joint Air to Ground Missile program, which reached milestone B in 2015.

While Mortlock writes and publishes case studies in his position at NPS, “the larger acquisition workforce never gets to read and study those case studies that board-selected product managers see. And what I was thinking was, ‘OK, let’s offer to the PEOs a chance to give their civilian workforce training, development and education through these case studies.’ So that’s what I really wanted to do.”

The case studies he uses—peer-reviewed, journal-published studies he has used in his classes for years—are built around three central themes: critical thinking, problem-solving and decision-making. The ones he selected for the class, he said, are applicable to the challenges facing defense acquisition at large. “We all know that the emphasis of senior leaders and Congress is, ‘OK, fix this broken acquisition system that’s too slow and unresponsive.’”

### A WELCOME DOSE OF REALITY

How was Mortlock’s class received? “It was overwhelmingly positive. ... They seemed really engaged and really appreciative of the fact that they had an opportunity to step back and just think about the business they’re in,” he said.

The students Mortlock gets in his PEO classes are quite different from the ones he gets at NPS, he noted. Students at NPS are typically officers at the O-4 level—majors in the Army, Air Force and Marine Corps, lieutenant commanders in the Navy—who are either new to acquisition or have had just one assignment. At



## Acquisition Workforce Professional Development Opportunity

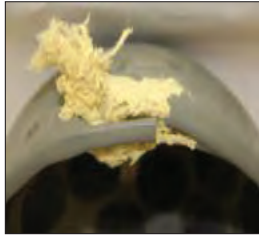
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##### INCREMENTAL DEVELOPMENT – EVOLUTIONARY ACQUISITION



Joint Common Missile Case Study

**Case study facilitator:** Dr. Bob Mortlock, Col. (USA, Ret.), CMBA, PMP, PE, Naval Postgraduate School

#### COMING TO AN INSTALLATION NEAR YOU?

Mortlock hopes to take his case-study class to PEO STRI, PEO GCS and PEO EIS again next year, and to other PEOs as well.

the PEOs, Mortlock is reviewing case studies with acquisition workforce professionals.

“The civilian acquisition workforce is so diverse, so experienced,” he said. “And so when you get those folks in a room together, it’s really incredible to see the dynamics. Some folks are just new. And some folks are very experienced. And to see them working on the same case study and giving different perspectives on the same case study ... In these cases studies there’s no right answer, usually, and that’s what makes it really interesting. Because they can learn from each other.”

Judith A. Gachupin, strategic planner for the Project Manager for Armored Multi-Purpose Vehicle within PEO GCS, took Mortlock’s class at Warren. “The studies provided insight into how the DOD [Instruction 5000.02] and acquisition management has changed over the years,” she said. “What was not even a consideration six to eight years ago is now possible today, as we work to ‘lean’ our processes and look at alternate solutions to speed up the acquisition process.”

She added: “This training was different, as we were using real program data versus a made-up training scenario. The real data brings a better sense of reality to the discussion and more clearly portrays the impact of the decisions we make as acquisition developers.”

Mortlock is hoping the three PEOs will invite him back next year, where he’ll introduce some new case studies and maybe help them develop a case study on a program specific to the PEO. “And maybe next year I get a few other PEOs to jump on.”

*For more information, contact Mortlock at [rfmortlo@nps.edu](mailto:rfmortlo@nps.edu).*

*MICHAEL BOLD provides contract support to the U.S. Army Acquisition Support Center. He is a writer-editor for Network Runners Inc., with more than 30 years of editing experience at newspapers, including the McClatchy Washington Bureau, The Sacramento Bee, the San Jose Mercury News, the Dallas Morning News and the Fort Worth Star-Telegram. He holds a Bachelor of Journalism from the University of Missouri.*





# SO LONG, ACRB—SORT OF

| Phased rollout of IPPS-A starts  
with U.S. Army Reserve.

*by Steve Stark*

*“We’re undoing  
40-plus years of  
nonintegrated  
systems, no  
software growth  
and no adherence  
to authoritative  
data.”*

**B**eginning in the third quarter of fiscal 2019, perhaps as early as August, the Acquisition Career Record Brief (ACRB) will begin its long ride into the sunset.

The ACRB’s departure—partial for now; the change immediately affects only the U.S. Army Reserve—comes as the first ripples from the Army’s phased rollout of the Integrated Personnel and Pay System – Army (IPPS-A) begin. The rollout will continue with the Army National Guard, and then the active-duty component, which doesn’t use the ACRB. Eventually, the massive IPPS-A will replace all of the current, stovepiped systems that originally made the ACRB necessary.

The Program Executive Office for Enterprise Information Systems has made IPPS-A’s rollout deliberate and painstaking, using each phase to improve it. As might be expected from a system that eventually will contain the records of multitudes, establishing it is “hard work,” said Col. Greg Johnson, IPPS-A’s lead for the Functional Management Division of the Army G-1 (Personnel)—and that may be understating the magnitude of difficulty.





#### DATA ON-THE-MOVE

Lt. Gen. Thomas C. Seamands, Army deputy chief of staff, G-1 (personnel), previews the IPPS-A app while visiting Pennsylvania Army National Guard Soldiers at Fort Indiantown Gap, Pennsylvania, in February. (Photo by Staff Sgt. Frank O'Brien, IPPS-A)

***“The program is working on a prototype of the new talent profile, which will incorporate 25 talent areas and provide a holistic view of Soldiers’ skills and abilities.”***

“We’re undoing 40-plus years of nonintegrated systems, no software growth and no adherence to authoritative data,” he continued. “IPPS-A’s progress is getting right at that problem set and synchronizing HR [human resources] data across the total force. We need to do this not only to make the system work, but also to set the foundation for using HR data to transform [IPPS-A] into a talent management system. We can’t get there until we clean up the data.”

For now, civilians and most of the Army National Guard will continue using the ARCB. (See related article, “Adapting to Enemy Contact,” about the rollout of IPPS-A to the Pennsylvania National Guard, on Page 26.)

#### NERDY DETAILS

Active-duty Soldiers either have an Officer Record Brief (ORB) or an Enlisted Record Brief (ERB). These records of Soldier activities are actually brief. They contain where the Soldier has been stationed, rank, promotion, education and other particulars of a Soldier’s service. They’re used throughout the military, not just the Army.

But because the National Guard and Reserve components didn’t use the same system (the Total Officer Personnel Management and Information System [TOPMIS]) to manage ERBs and ORBs, the Army created the ARCB. Acquisition civilians also use the ARCB to

have a record that parallels that of their military counterparts. And while TOPMIS feeds automatically into the Career Acquisition Personnel and Position Management Information System (CAPP MIS), the systems that the Guard and Reserve use do not.

What that's meant for National Guard and Reserve Soldiers is that they've had to record separately the data in their ORB or ERB in their ACRB. That will no longer be the case for reservists, as of approximately August or September of this year. Guardsmen and -women will have to wait a bit longer, as will the active-duty Army, while IPPS-A continues rolling out.

If that weren't sufficiently chaotic, those in the Reserve component who also are civilian acquisition professionals will still have the ACRB until every Army employee has been rolled into IPPS-A.

IPPS-A is crushing a lot of stovepipes. Indeed, Johnson said in an email exchange with Army AL&T, IPPS-A will subsume more than 30 systems and eliminate more than 300 interfaces. IPPS-A will reduce complexity, as well, with 154 business processes across all three components shrunk to 34.

### ORB AND ERB EXTINCTION

But wait! There are more extinctions coming. The ORB and ERB are also headed that way, as IPPS-A's outward ripples continue. IPPS-A will replace them with the Soldier Record Brief (SRB).

"The Army is pursuing a three-in-one solution with the SRB," Johnson said, "meaning that all three components, enlisted and officers, will all have the same standardized document to display their career information. The [Army National Guard] will be the first component to use SRB live in the system during our Release 2 fielding. As we define the design and build of Release 3," he continued, "the program is working on a prototype of the new talent profile, which will incorporate 25 talent areas and provide a holistic view of Soldiers' skills and abilities."

Which could mean, despite its name, that the Soldier Record Brief won't actually be brief because, unlike its predecessors, it's going to have a lot of detail that will provide a good deal more value to the Army.

"The SRB is an incremental step toward larger talent management efforts," Johnson said. "The talent profile that is currently

being developed in partnership with HRC [the U.S. Army Human Resources Command] and the Army's Talent Management Task Force will describe every Soldier's talents at a granular level and piece together data elements across five domains: knowledge, skills, behaviors, experience and readiness. The talent profile will contain more than twice the data elements that are currently collected in our legacy systems."

Civilians, Johnson said, are not currently incorporated into IPPS-A's design. If that changes, then a similar talent profile will have to be developed to meet that cadre's needs.

### CONCLUSION

So, what does all of this mean for those with an ACRB? For most, not a lot—just yet. But for those who will be directly affected by the phased extinction of the ACRB, it will be a big deal.

Those affected will still have a CAPP MIS account to access and edit the individual development plan, maintain continuous learning points and keep a record of all acquisition courses completed. Because the ORB and ERB will go away with the rollout of IPPS-A, users will want to make sure that the information contained in their ORB or ERB is reflected in CAPP MIS. And accurate ORBs or ERBs should translate to accurate Soldier Record Briefs.

That shouldn't be a burden on anyone, just something to watch. The transition will reduce data repetition, eliminate the need to proactively update the ACRB and save time to focus on other priorities.

*For more information, contact Lt. Col. Ryan Leonard, Army Reserve, at [ryan.d.leonard.mil@mail.mil](mailto:ryan.d.leonard.mil@mail.mil) or 703-664-5719; or Lt. Col. Teresa Childs, Army National Guard, at [teresa.e.childs.mil@mail.mil](mailto:teresa.e.childs.mil@mail.mil) or 703-664-5722.*

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*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 and S&T, he is the best-selling ghostwriter of several consumer-health oriented books and an award-winning novelist. He is Level II certified in program management.*





## BENTON GADY

**COMMAND/ORGANIZATION:** Materiel Systems Organization, U.S. Army Tank-Automotive and Armaments Command

**TITLE:** Director, Acquisition Life Cycle Cell

**YEARS OF SERVICE IN WORKFORCE:** 18

**DAWIA CERTIFICATIONS:** Level III in program management and in engineering

**EDUCATION:** M.S. in mechanical engineering, Wayne State University; B.S. in mechanical engineering, Michigan Technological University

**AWARDS:** Commander's Award for Civilian Service

# TACOM'S SUSTAINMENT LIAISON

**S**ure, acquisition can be a rough-and-tumble field. But have you ever tried working with hockey parents? Benton Gady has, and his experience in both arenas is paying dividends for the sustainment of Army ground platforms.

Gady is chief of the Acquisition Life Cycle Cell within the Materiel Systems Organization at the U.S. Army Tank-Automotive and Armaments Command (TACOM), advising the U.S. Army Materiel Command (AMC) on decisions related to efficient and effective sustainment. "I sit on senior Army decision review boards and communicate the AMC concerns regarding requirements or acquisition planning" to teams at U.S. Army Training and Doctrine Command and the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology. As part of that job, he has prepared and briefed the commanding major general of TACOM as well as AMC's executive deputy to the commanding general on the programs that have appeared before the Army Requirements Oversight Council for approval. Additionally, Gady was recently named director of the Industrial Base Health Directorate, providing independent analysis of the TACOM industrial base that supports the National Security Strategy.

"My position is a one-off, and it's kind of sideways to TACOM," Gady explained. TACOM is tasked with sustaining Army ground systems, Soldier systems, and chemical and biological defense systems; and as a result oversees the sustainment efforts of five program executive offices (PEOs).

"There's just my boss and me as the PM-trained acquisition advisers to TACOM. We're the liaisons between the program managers and the sustainment community, and we work with leadership at the two-star level to ensure that good decisions are made relative to acquisition and sustainment of Army ground vehicles."

Gady began his career as a college engineering co-op student in the former U.S. Army Tank Automotive Research and Development Center (TARDEC), now the U.S. Army Combat Capabilities Development Command's Ground Vehicle Systems Center, and has since "bounced around the Detroit Arsenal in Warren, Michigan, working within TARDEC, the PEO for GCS [Ground Combat Systems] and now on the sustainment side with TACOM."

Working first as an engineer on developmental projects, Gady switched to program management in 2011 as an assistant product manager in charge of executing the Engineering Change Proposal 2 program for Bradley Fighting Vehicles at PEO GCS—a switch that marked a turning point in his career, he said. "I didn't really know what it entailed before I started, but I realized fairly quickly that the position offered a lot more influence over a program than an engineering position—and that's coming from

an organization that already gave its engineers a pretty big role. I found that I really enjoy managing all aspects of cost, schedule and performance by trading between the three during planning and execution.”

After Gady switched to the product management role, his manager asked him to consider competing on the selection board for product and program manager positions. “I had never considered it until he asked, but ever since, I’ve been working to build out my file for competition. I got the paperwork together and gathered a lot of input from military and civilian personnel at the O-5 and O-6 level about what the board looks for.”

So far, so good: He applied to the 2018 boards and was selected as an alternate for project manager and product director positions. “I’m told that being named as an alternate is a great outcome for the first time,” he said, “and I was able to speak with Maj. Gen. [Brian P.] Cummings, the PEO for GCS, and Mr. [Timothy G.] Goddette, the PEO for Combat Support and Combat Service Support, after the selections were announced to get their feedback on my application and the overall selection process.”

What he learned is that senior rater potential evaluations (SRPEs) and job titles are the two most important parts of an applicant’s file. “The board looks for applicants who have received exceptional SRPE ratings on positions that feed into PM slots,” Gady said. “My current role is kind of an outlier, which I think affected the outcome.” He’s now looking to get back into positions that have a straighter path to a PM role.

His advice for career planning? Get after it early. “Talk to the leaders in your organization and map a path within a career field or two. But be flexible and don’t be afraid



## NEW HEIGHTS

Gady at Zugspitze, the highest peak in Germany, outside the town of Garmisch-Partenkirchen, during his USAREUR assignment. (Photo courtesy of Benton Gady)

of opportunities that present themselves. I had the chance to spend five months in Europe on a developmental assignment by responding to an email message requesting volunteers.” The assignment was part of the European Deterrence Initiative, which was looking for candidates to fill a vacancy for an acquisition liaison with experience in heavy vehicle capabilities.

Gady worked with the U.S. Army Europe (USAREUR) G-3, fielding questions from Soldiers about vehicle capability, availability and timelines, and reached back to his contacts in the Bradley community for support. (And in a small-world twist, a friend of Gady’s from college—a major in the Acquisition Corps—now works in the same position.) “The Army has many worldwide and interesting jobs to take advantage of. Move around, know your peers and take training,” he said.

When he’s not at work, Gady coaches youth hockey teams and plays on a team

of his own. “My work to manage schedules and team money directly influences my ability to manage teams,” he said, “and my leadership practice at work also blends well with my ability to lead parents and players. If one thing about sports parents has been documented well, it’s their craziness. Keeping all that in check to hold a team together has been a significant challenge.”

Both rink-side and at work, he has learned that it’s important to remain calm, think about problems critically, listen to others, “and understand that perception is 100 percent reality. We cannot field the greatest Army in the world with a bunch of individuals. We must work together on our problems, clearly communicate with each other, and integrate solutions to those programs to achieve success.”

—SUSAN L. FOLLETT



# FOURTH SSCF SITE OPENS

| Picatinny Arsenal is new home for Defense Acquisition University program.

**U**ntil now, acquisition professionals at Picatinny Arsenal had to travel significant distances to attend Senior Service College, but that has changed with the opening of a new school at the New Jersey arsenal.

The Defense Acquisition University (DAU) Senior Service College Fellowship (SSCF) is a 10-month, graduate-level program that prepares Army senior civilians for high-level Army acquisition and sustainment careers, explained Chris Grassano, director of talent management and director of the Picatinny Arsenal Senior Service College Fellowship.

The first Picatinny SSCF cohort, or class, will begin in July 2019.

The fellowships were established to provide more civilians the opportunity to develop senior-level leadership skills, broaden and strengthen their acquisition acumen, and better understand the National Security Strategy and its application to the acquisition profession.

Additionally, the fellowship program allows civilians to attend service college without having to relocate, which reduces the financial strain of moving their families or being away from home for 10 months.

In addition to the broadened exposure that the fellows will obtain as a result of visits to DOD and contractor facilities, the fellowships also offer specialized learning objectives that are applicable to that location's mission. For instance, the Picatinny SSCF will have speakers and trips focused on armaments and ammunition, since that is the mission of the primary organizations—including the Joint Program Executive Office for Armaments and Ammunition (JPEO A&A)—at Picatinny.

“My Senior Service College Fellowship experience was personally very rewarding,” said Andrew DiMarco, deputy JPEO A&A and a graduate of the SSCF in Warren, Michigan.

“Although demanding, it provided me an excellent opportunity to expand my knowledge and abilities, and added a number of tools to my kit bag as I moved into chief of staff and deputy PEO positions upon completion of the program,” DiMarco said.

In addition to reading assignments and analyzing case studies, students take career-broadening trips, visiting Capitol Hill and combatant commands and attending seminars.

“The program brings together topics from the strategic through tactical levels while incorporating leadership and interpersonal development opportunities that will definitely enhance your skills,” DiMarco said.

### WHO SHOULD APPLY

Ideal applicants are GS-14 or GS-15 (or equivalent) civilians who want to advance their careers and serve the Army at a more senior level—particularly civilians who have not had the opportunity for broadening experiences, such as working at the Pentagon or other organizations outside of Picatinny.

Grassano said the program is also for those who aspire to be a member of the Senior Executive Service, a project manager (PM) or in a director-level position.

In addition to Army civilians, other government- or industry-related employees in the local geographic region, such as reservists or Navy civilians, can apply to the SSCF.

“The fellowship allowed me to forge new relationships and share experiences with professionals from across the acquisition enterprise—something we don’t often have time to do at our local installation,” DiMarco said. “I highly recommend Senior Service College and the fellowship to those that want to expand their professional tool kit as they prepare themselves for more senior leader positions across the enterprise.”

The Picatinny Arsenal SSCF is the Army’s fourth. There are also SSCF sites in Huntsville, Alabama; Aberdeen Proving Ground, Maryland; and Warren, Michigan. All the sites participate via video teleconference, with instructors teaching from the various SSCF sites. There are breakout sessions within the sites, as well as online and onsite learning.

The next application window is expected to open in late 2019, with classes starting the following July. Acquisition professionals interested in applying can go to <https://asc.army.mil/web/career-development/programs/defense-acquisition-university-senior-service-college/> or call 973-724-2651 with questions.

—AUDRA CALLOWAY

### ASPIRE TO SENIOR-LEVEL SERVICE?

The Senior Service College Fellowship, now available at Picatinny Arsenal, New Jersey, is a good opportunity for civilians who want to serve in project management or director roles, or reach the Senior Executive Service. Civilians who haven’t had a broadening assignment in organizations outside of Picatinny are particularly encouraged to check it out. (Image courtesy of DAU)





# ON THE MOVE

## DEPUTY ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH AND TECHNOLOGY

### 1: NEW DIRECTOR FOR GROUND MANEUVER PORTFOLIO

**Jeffrey Singleton**, left, director of technology in the Office of the Deputy Assistant Secretary of the Army for Research and Technology (ODASA(R&T)), welcomed **Keith Jadus** as director for the Ground Maneuver Portfolio. Jadus, who joined the office April 8, oversees ground vehicle technologies supporting the Army's modernization priority for next-generation combat vehicles, as well as ground platform sustainment, austere entry and maneuver, critical asset protection, and explosive hazard detection and neutralization. (Photo by Lora Latham, ODASA(R&T))



### 2: BUSINESS & OPS DIRECTOR DEPARTS

**Dr. Thomas P. Russell**, right, deputy assistant secretary of the Army for research and technology (DASA(R&T)), presented a farewell gift and DASA(R&T) coin March 28 to **Sheri Briggs**, outgoing director for Business and Operations. Briggs was responsible for resource management for Army science and technology (S&T) funding across all phases of the planning, programming, budgeting and execution process, and was the primary S&T funding interface with the Office of the Undersecretary of Defense, the assistant secretary of the Army and HQDA G-8. She now serves as chief of the Research, Development, Test and Evaluation Division in the Investments Directorate of the Army Budget Office. (Photo by Lora Latham, ODASA(R&T))



### 3: S&T SPECIAL PROGRAMS DIRECTOR MOVES ON

**Dr. Thomas P. Russell**, right, DASA(R&T), presented a farewell gift and DASA(R&T) coin March 28 to **Kris Gardner**, outgoing director of Army Science and Technology Special Programs and Intelligence. Gardner was with DASA(R&T) since 2015, and also served as director of integration and acting director for technology. He is now director of Science and Technology Protection in the Office of the Undersecretary of Defense for Research and Engineering. (Photo by Lora Latham, ODASA(R&T))





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## U.S. ARMY CONTRACTING COMMAND – ORLANDO

### 4: PROMOTION, TRANSITION AT ACC-ORLANDO

**Master Sgt. Larry Buwee** received a certificate of promotion April 11 at a ceremony led by **Michael Harris**, acting executive director of Army Contracting Command (ACC) – Orlando. Buwee's wife, **Aletha**, and his children, **Charles** and **Jada-Jordan**, were also on hand for the ceremony at ACC – Orlando headquarters at Naval Support Activity (NSA) – Orlando, Florida.

Buwee spent two years working on the Simplified Acquisition Procurement and Foreign Military Sales teams at ACC – Orlando, and previously served with the 925th Contracting Battalion at Fort Drum, New York. He will leave ACC – Orlando this summer for the 928th Contracting Battalion Regional Contracting Office – Bavaria, in Grafenwoehr, Germany, where he will serve as noncommissioned officer in charge for Contracting Support Operations. (Photo by Doug Schaub, NSA – Orlando)

## U.S. ARMY RAPID CAPABILITIES AND CRITICAL TECHNOLOGIES OFFICE

### 5: NEW LEADERSHIP FOR RCCTO

Undersecretary of the Army **Ryan D. McCarthy** welcomed **Lt. Gen. L. Neil Thurgood** to the U.S. Army Rapid Capabilities and Critical Technologies Office (RCCTO) at a ceremony April 24 at Redstone Arsenal, Alabama, that also marked Thurgood's promotion from major general. McCarthy and Thurgood's wife, **Shauna**, helped pin on Thurgood's new stars.

Thurgood, who came to RCCTO after serving as director for test at the Missile Defense Agency, now serves as director of Hypersonics, Directed Energy, Space and Rapid Acquisition. In this position, he directs RCCTO, which includes the Hypersonics Project Office. **Col. John Eggert**, who served as RCCTO acting executive director, now serves as the organization's chief of staff. (Photo by Bryan Bacon, Redstone Rocket)

## PROGRAM EXECUTIVE OFFICE FOR AVIATION

### 6: MILITARY DEPUTY HONORED FOR ASA(ALT) ROLE

**Dr. Bruce D. Jette**, right, assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)), presented the Legion of Merit award to **Col. Robert Barrie**, military deputy to the program executive officer (PEO) for Aviation, Feb. 13 at Redstone Arsenal, Alabama. Barrie was recognized for serving as the ASA(ALT) chief of staff from January to December 2018. (Photo by Bill Brown, PEO Aviation)

### 7: RETIREMENT CAPS 29-YEAR CAREER

**Col. Randy Murray**, right, assistant program executive officer for G-3, Operations, at PEO Aviation, accepted a certificate of appreciation from **Brig. Gen. Thomas H. Todd III**, PEO Aviation, on behalf of the president of the United States at a ceremony March 8 at Redstone Arsenal marking Murray's retirement. Murray, who retired after 29 years of service, also received the Legion of Merit Award and the Honorable Order of Saint Michael Silver Award, which recognizes individuals who have made significant contributions to Army aviation. (Photo by Daniel Cunningham, PEO Aviation)



### 1: PEO LEADS PROMOTION CEREMONY

**Col. Timothy McDonald**, right, was promoted to the rank of colonel during a ceremony March 8 at Redstone Arsenal. **Brig. Gen. Thomas H. Todd III**, PEO Aviation, administered the oath of office. McDonald is currently assigned to PEO Aviation headquarters, where he works on international operations with an emphasis on Afghanistan. (Photo by Michelle Miller, PEO Aviation)

### 2: LOGISTICS CHIEF RETIRES

**Edward M. Ward** received a certificate of retirement from **Brig. Gen. Thomas H. Todd III**, PEO Aviation, during a ceremony March 15 at Redstone Arsenal marking Ward's retirement. Ward joined PEO Aviation in 2010 as the logistics chief and product support manager for the Unmanned Aircraft Systems Program Office before becoming the director of G-4, Logistics, in 2017. (Photo by Michelle Miller, PEO Aviation)

### 3: SPOUSES EARN DUAL PROMOTIONS

Spouses **Jared Thompson**, center, and **Josephine Thompson** recited the oath of office administered by **Brig. Gen. Thomas H. Todd III**, PEO Aviation, during a ceremony Jan. 4 at Redstone Arsenal promoting them to the ranks of chief warrant officer (CW) 5 and colonel, respectively. CW5 Thompson is an experimental test pilot for the Aviation Flight Test Directorate and senior warrant officer at Redstone

Test Center. He is one of only five experimental test pilots who hold the CW5 rank. Col. Thompson is product director for Medical Evacuation for PEO Aviation's Utility Helicopters Project Office, and is the active Army's second-most senior medevac acquisitions officer. (Photo by Dorothy Moore, PEO Aviation)

### 4: APACHE ASSISTANT PM RETIRES

**Lt. Col. Lance Culver**, right, accepted a certificate of retirement from **Brig. Gen. Thomas H. Todd III**, PEO Aviation, March 29 at Redstone Arsenal, in honor of his 28 years of service. Culver served as assistant project manager for PEO Aviation's Apache International Division. (Photo by Shannon Kirkpatrick, PEO Aviation)

### 5: AVIATION ACCOMPLISHMENTS RECOGNIZED

**Col. Chad Smith**, left, presented the Meritorious Service Medal to **Lt. Col. Tim Bracken** for outstanding performance in several critical positions from March 2018 to February 2019, culminating as the G-3 contingency operations officer. Bracken was responsible for program management, research and development, logistics support and fielding of critical aviation systems that ensured safe commercial and combat operations for Army aviation assets deployed worldwide. He has departed PEO Aviation for an assignment at Fort Belvoir, Virginia. (Photo by Paul Stevenson, PEO Aviation)





## PROGRAM EXECUTIVE OFFICE FOR COMBAT SUPPORT AND COMBAT SERVICE SUPPORT

### 6: REORGANIZATION AT PM TRANSPORT SYSTEMS

**Col. Dan Furber**, right, project manager for Transportation Systems, presided over a March 13 ceremony at the Program Executive Office for Combat Support and Combat Service Support (PEO CS&CSS) in Warren, Michigan, marking the stand-down of the Product Manager for Mine Resistant Ambush Protected (MRAP) Vehicle Systems and the Product Manager for Medium Tactical Vehicles (MTV). The two organizations merged as the Product Manager for Multi-Mission Protected Vehicle Systems, which remains under the purview of the Project Manager for Transportation Systems. **Lt. Col. Michael Riley**, left, former product manager for MRAP Vehicle Systems, will lead the new organization. **Alvin Bing**, upper right, former product manager for MTV, was awarded the Meritorious Civilian Service Medal for his accomplishments. He now serves on the PEO CS&CSS staff, leading strategy initiatives for tactical wheeled vehicles. (Photos by Ted Beaupre, Multimedia Visual Information Center – Detroit Arsenal)

## PROGRAM EXECUTIVE OFFICE FOR COMMAND, CONTROL AND COMMUNICATIONS – TACTICAL

### HMS CHARTER CHANGES HANDS

**Col. Michael Baker** relinquished the charter of the Product Manager for Handheld, Manpack and Small Form Fit to **Lt. Col. Raymond Yu** at a June 13 ceremony at Aberdeen Proving Ground, Maryland, led by **Maj. Gen. David G. Bassett**, program executive officer for Command, Control and Communications – Tactical. Baker was promoted from lieutenant colonel at the ceremony, and will be attending the U.S. Army War College.



## ARMY CHIEF OF STAFF GEN. MARK A. MILLEY ANNOUNCED THE FOLLOWING OFFICER ASSIGNMENTS:

**Maj. Gen. Mitchell L. Kilgo**, director, J-6, U.S. Central Command, MacDill Air Force Base, Florida, to commanding general, U.S. Army Communications-Electronics Command (CECOM) and Aberdeen Proving Ground, Aberdeen Proving Ground, Maryland.

**Maj. Gen. Steven A. Shapiro**, commanding general (CG), 21st Theater Sustainment Command, U.S. Army Europe, Germany, to CG, U.S. Army Sustainment Command, Rock Island, Illinois.

**Maj. Gen. Randy S. Taylor**, CG, CECOM and Aberdeen Proving Ground, Aberdeen Proving Ground, Maryland, to chief of staff, U.S. Strategic Command, Offutt Air Force Base, Nebraska.

**Maj. Gen. Flem B. Walker Jr.**, CG, 1st Sustainment Command (Theater), Fort Knox, Kentucky, to deputy chief of staff for logistics and operations, U.S. Army Materiel Command (AMC), Redstone Arsenal, Alabama.

**Brig. Gen. Edmond M. Brown**, deputy CG (Support), 1st Cavalry Division, Fort Hood, Texas, currently deployed as commander, Train Advise Assist Command – South, Resolute Support Mission, North Atlantic Treaty Organization, Operation Freedom's Sentinel, Afghanistan, to deputy director and chief of staff, Futures and Concepts Center, U.S. Army Futures Command, Joint Base Langley-Eustis, Virginia.

**Brig. Gen. Christopher O. Mohan**, deputy chief of staff for logistics and operations, AMC, Redstone Arsenal, to CG, 21st Theater Sustainment Command, U.S. Army Europe, Germany.

**Brig. Gen. Michael J. Talley**, deputy CG, Regional Health Command – Atlantic, Fort Belvoir, Virginia, to CG, U.S. Army Medical Research and Materiel Command and Fort Detrick, Fort Detrick, Maryland.



# 6<sup>th</sup> Annual 2019 Major General Harold J. "Harry" Greene Awards for Acquisition Writing



"Our challenge is to prepare for the future. We support the current fight, but can't let the day to day challenges prevent us from looking down the road."

*-Major General Harold J. Greene*

The competition is open to everyone . . . identify, discuss and influence the outcome of significant issues that affect U.S. Army acquisition through critical writing . . . tell your story to internal and external stakeholders.

Share your ideas, expertise and experiences by submitting articles, essays and opinion pieces in the following categories:

- Acquisition Reform
- Future Operations
- Innovation
- Lessons Learned



For complete competition details, go to  
[www.army.mil/asaalt](http://www.army.mil/asaalt)



# Office of the Assistant Secretary of the Army (Acquisition, Logistics and Technology)

**The Honorable Bruce Jette**  
**ASA(ALT)**  
AAE & SPE  
SAAL-ZA

As of 06/05/19

**LTG Aundre Piggee**  
Deputy Chief of  
Staff  
G-4 Logistics

**LTG Bruce Crawford**  
Chief  
Information  
Officer  
G-6

**LTG Paul Ostrowski**  
Principal Military  
Deputy, DAAC  
SAAL-ZB

**Mr. Jeffrey White**  
Principal Deputy  
SAAL-ZX

**SGM Jacinto Garza**  
Sergeant Major  
SAAL-ZB

**Mr. Ray Gagne (acting)**  
DASA  
Acquisition Policy  
& Logistics  
SAAL-ZL

**Ms. Ann Cataldo**  
DASA Defense  
Exports &  
Cooperation  
SAAL-ZN

**Mr. John Daniels**  
DASA  
Plans, Programs  
& Resources  
SAAL-ZR

**BG Alfred Abramson**  
JPEO  
Armaments &  
Ammunition

**MG Thomas Todd III**  
PEO  
Aviation

**MG David Bassett**  
PEO  
C3T

**Mr. Tim Goddette**  
PEO  
CS & CSS

**Dr. Thomas Russell**  
DASA  
Research &  
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“When senior decision-makers need information, they have to send a request through their chain of command. That request then gets consolidated over the course of days and weeks by various headquarter elements until the needed information is sent back up the chain. It takes too much time. At present, there is no efficient and effective way to store and share the data that leaders need when they need it. We are changing that.”

**Dr. Bruce D. Jette**  
*Army Acquisition Executive*  
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