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JULY-SEPTEMBER 2016



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JULY-SEPTEMBER 2016

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(SOURCE: USAASC/AAGGraphics/Thinkstock)

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COMMUNICATION WITH INDUSTRY**

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**HALLOCK HOSTS SENIOR LEADER  
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By Amanda Jordan



**OCS EFFECTS GO BEYOND INDIVIDUAL  
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**JUNE 2016 HOT TOPICS**  
By U.S. Army DACM Office



**FACES OF THE FORCE: LAUREN JOHNSKY**  
*CDG/AAF helps to fill leadership gaps*  
By Susan L. Follett

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Read more about how the Engineered Resilient Systems program significantly ups the number of design options examined early in the acquisition process, in the same or less time compared with traditional methods, in **"A MILLION MORE OPTIONS FOR YOUR NEXT PURCHASE."**

See the facilities of the U.S. Army Research Laboratory, download presentations and watch videos from the 2015 ARL Open Campus Open House in **"NEW SCIENCE CLUB."**

Take a look at the history of the Watervliet Arsenal as discussed in **"FORGING A PARTNERSHIP ON THE SHOP FLOOR."**

Watch and listen as Stephen P. Welby, assistant secretary of defense for research and engineering, addresses the second Army Innovation Summit on April 5 at Aberdeen Proving Ground, Maryland, in **"MAKING INNOVATION HAPPEN."**

Read how the chip-scale atomic clock will help warfighters in **"IT'S ABOUT TIME—ALL OF IT."**

Download the latest Army Data Strategy outlined by the CIO/G-6 in **"OPEN SOURCE BIG DATA."**

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## From the Editor-in-Chief



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### TALK BACK

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**T**he relationship between the government and industry should not be like the child's game of "telephone line." If you remember, telephone line is the game where you start a word or phrase at one end of the room and each person whispers it only once to the next person, and so on, until it reaches the last person in the room.

The whole point of the game, and the fun of it, is that what started as a perfectly sensible statement, such as, "The Army needs new vehicles," ends up, by the time the last kid in the room interprets it, transmogrified into something completely nonsensical like, "The marmalade has hiccups."

Of course, telephone line is just a game, but in defense acquisition's not-too-distant past, it has seemed at times that breakdowns in communication between government and industry became their own version of that childhood game. The government drafts a requirement for what it thinks is a simple system but doesn't keep industry well-informed on what exactly it needs, and the end product becomes the stuff of congressional inquiries, vitriolic hearings and nightmarish scandal.

Collaborating with industry is not tantamount to President Dwight Eisenhower's ominous military-industrial complex, perceived by many as the informal alliance between the nation's military and the defense industry and the source of Eisenhower's concern that industry would gain undue sway over defense policy—prompting him to warn government to "guard against the acquisition of unwarranted influence" by industry.

In fact, collaborating with industry is quite the opposite. If we don't bring industry to the table more frequently and ensure that both parties have a clear understanding of what the buyer (the government) wants and what industry (the maker) can create, then we risk wasting hard-earned taxpayer money and not getting Soldiers the equipment they need to prevail against the enemy.

Working closely with industry is especially important if the Army is going to achieve DOD's third offset strategy—its plan to maintain U.S. technological

superiority over its rivals by investing in specific research areas like man-machine teaming, autonomous learning systems and semiautonomous weapon systems. To be successful, this must be done in sync with industry. The National Defense Authorization Act for Fiscal Year 2017, currently awaiting reconciliation between the House and Senate versions, gives the services flexible funding to encourage experimentation and prototyping.

Partnering with industry is nothing new, but how we partner today versus how we did it just a few years ago is like night and day, partly because of changes imposed by DOD's Better Buying Power (BBP) initiative, partly because of legislation (such as the FY17 defense authorization bill), and partly because of creative thinking by the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology and our program executive offices. These initiatives and more are on full display in this issue.

Learn how a competitive nondevelopmental item approach to procuring the latest tactical radio technology is saving the developer time and money while ensuring that the radio is compatible with government-owned waveforms, in "Network Marketplace: Open for Business" (in Acquisition). Also, big data is big business. See how government is partnering with the software industry to develop standards for interoperability, encourage vendors to develop applications and avoid proprietary technologies in "Open Source Big Data" (in the BBP 3.0 section). Finally, get schooled with the U.S. Army Research Laboratory's (ARL's) Open Campus experiment in "Then and Now," and see how the open campus builds on the relationships ARL has forged among government, academia and industry to develop technologies for the warfighter.

The magazine's sole purpose is to share information among acquisition professionals. Sometimes, its mission is also to honor those who help us in that sharing, so be sure to take a look at "Recognizing the Best" on Page 167. As always, if you have questions, comments or just a great idea for an upcoming story, please send me a note at [ArmyALT@gmail.com](mailto:ArmyALT@gmail.com). I look forward to hearing from you.

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





## WHAT WE'VE BEEN UP TO

Anthony Steele, center, with the U.S. Army Aviation and Missile Research, Development and Engineering Center (AMRDEC) Weapons Development and Integration Directorate, explains AMRDEC's missile portfolio during the Association of the United States Army's 17th annual Missile Symposium April 19 at Redstone Arsenal, Alabama. Forums like the Missile Symposium help provide industry with a clear view into the Army's priorities, making it more likely that industry will tailor its R&D to Army needs. Industry support for independent R&D is critical in a time of reduced R&D funding in DOD. (Photo by Nikki Montgomery, AMRDEC Public Affairs)





FROM THE AAE



FROM THE AAE

FROM THE ARMY  
ACQUISITION EXECUTIVE  
THE HONORABLE KATRINA MCFARLAND



# HIGH STAKES, HIGH REWARD

Strong partnerships with industry are more important than ever as R&D funding declines and need for innovation grows

In recent years, Army AL&T magazine has covered various facets of the Better Buying Power program that provide a framework to help us improve how we conduct business, including leveraging small business innovations, revamping acquisition and strengthening tradecraft of the acquisition workforce. This issue highlights another aspect of the program that remains integral to our mission: effective partnerships with industry. While the dynamics of our relationship with industry may evolve with the changing acquisition landscape, the fundamental need for a collaborative exchange of ideas with industry remains constant.

One of the hallmarks of the Army acquisition enterprise is our unwavering commitment to innovation. We welcome innovation from all sources, not just our own. For example, while we constantly strive to develop breakthrough technologies in our labs and research, development and engineering centers, we also encourage the development of innovative solutions from industry partners, including

small businesses. This respect for innovation regardless of origin is what keeps the Army in the top ranks of small business obligations among the services. In Army acquisition, we also work closely with the U.S. Army Research Laboratory (ARL) and welcome its expansion to form ARL-West. This partnership between ARL and the Institute for Creative Technologies at the University of Southern California will leverage the subject matter expertise and innovation in the region's technical centers.

## COMMUNICATING IS KEY

Our collaboration with industry ensures that we safeguard our technological superiority against our adversaries. However, with the considerable mutual advantage of industry collaboration comes increasing responsibility to maintain efficiency and professionalism throughout the acquisition life cycle. One way we accomplish this is by maintaining consistent and thorough dialogue with industry partners.





### EXPOS KEEP WORKFORCE UP TO DATE

Jim Simson, a vendor with Automated Business Power Inc., speaks to Sgt. Maj. Ricardo Samudio, U.S. Army Europe G-6 sergeant major, during the semiannual U.S. Army Garrison Wiesbaden Tech Expo Feb. 2 in Wiesbaden, Germany. Featuring more than 20 vendors displaying technologies for potential government use, including cybersecurity, mobile devices and communications, data storage and retrieval, and cloud computing, the expo is one of many ways Army acquisition keeps abreast of what industry is doing, in order to deliver cutting-edge products to the Soldier. (U.S. Army photo by William B. King, 5th Signal Command Public Affairs)



### HUMAN, MEET COMPUTER

As part of their research to improve human-computer interaction, Institute for Creative Technologies researchers and engineers experiment with delivering virtual humans over mobile phones. The Army plans to recruit as many as 70 researchers to work at ARL-West, which is located at the University of Southern California's Institute for Creative Technologies. The institute is in Playa Vista, about 10 miles west of the USC campus. (Photo by Stephanie D. Kleinman, SDK Photo & Design)

Previous issues of AL&T magazine also have explored the role of requirements in the acquisition process, noting that requirements lay the groundwork for acquisition and play a major part in determining the success or failure of a program. If sound, achievable requirements are the foundation of the acquisition life cycle, then communication takes it one step further. Dialogue among industry and program managers from the government and military prevents the inefficient use of time and funding in pursuit of “unobtainium” and addresses affordability and feasibility issues in requirements while they are still fixable.

This communication with industry is necessary to leverage the public funds provided to industry for independent research and development (IR&D). Industry's IR&D yields critical innovation for both DOD and the private corporations, which is why the government allows contractors access to these public funds. There is also contractor research and development (CR&D) funding that does not come from public funds.

As the Army's research, development and acquisition funding has declined, the defense industry has also reduced its CR&D. This makes IR&D more valuable. The Army has succeeded in preserving its science and technology investment in the past year with funding for basic research and technology development that will help offset some of the CR&D reduction. However, in this fiscally constrained environment, it is even more important to collaborate with industry on IR&D to ensure that we leverage these capabilities to support our warfighters.

### FACE-TO-FACE ENGAGEMENTS

We recognize that open communication is the backbone of military-industry





## AN INVITATION TO LEARN AND DISCUSS

Dr. Bill Lewis welcomes vendors to the AMRDEC Aviation Development Directorate Science and Technology Industry Day March 2 at Redstone Arsenal, Alabama. During the two-day event, speakers briefed industry participants on AMRDEC's contracting processes and timelines so that private-sector suppliers get a sense of what collaborating with the government is like. After the event, industry representatives had a week to submit follow-up questions. (Photo by Nikki Montgomery, AMRDEC Public Affairs)



collaboration at all levels. From a leadership perspective, we in the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT)) welcome the opportunity to engage with countless industry representatives at annual forums such as those of the Association of the United States Army, the National Defense Industrial Association and the Army Aviation Association of America.

We facilitate industry CEO engagements across the Army staff. Through the Office of the Deputy Assistant Secretary of the Army (DASA) for Defense Exports and Cooperation, we advocate for increased international sales that allow American companies to maintain a skilled workforce and sharpen capabilities even in times of decreased U.S. military spending. In FY15, these international sales had a case value over \$20.4 billion.

Through the Office of the DASA for Procurement, we have extended the Superior Supplier Incentive Program (SSIP) to the Army. SSIP, originally a Navy program, is a tool for helping industry see which business units are performing at their highest potential, as well as to guide companies toward areas of improvement.

Collaboration with the private sector also extends to program executive offices (PEOs) through regular industry day events. These industry days serve a dual purpose: They allow program managers to assess the technologies available in the marketplace while providing a forum for dialogue and collaboration between industry and government to efficiently design and field new capabilities.

Through the Office of the Army Director for Acquisition Career Management, we encourage participation in the Training with Industry (TWI) program. TWI allows Army Acquisition Workforce members to participate in a hands-on developmental assignment in a private corporation, affording a well-rounded perspective that enhances continued collaboration upon return to the acquisition enterprise. With each of these avenues for industry partnership, we strengthen our potential for innovation, from the leadership level down to individual members of the workforce.

## CONCLUSION

This partnership is not without its challenges and opportunities, as this issue of Army AL&T will explore. With so much at stake as we work to develop and field the best capabilities to Soldiers, we need to constantly ask ourselves how we can improve our partnerships with industry and the dialogue necessary to sustain them. Are we getting the most out of our TWI program? Are we effectively navigating the often tangled web of intellectual property rights as we pursue open systems architecture? Are we using PEO industry days, Army leadership CEO meetings and trade shows to the highest extent as forums for communication and idea sharing?

We ask ourselves these questions and devote our attention to this matter because we understand that our relationship with industry strengthens our relationship with the warfighter. Collaborating with industry is a fundamental necessity in our mission to equip Soldiers with capabilities at the forefront of innovation.





# FACES *of the* FORCE

## MS. KATHERINE B. PARKER

### Stepping up in times of crisis

#### MS. KATHERINE B. PARKER

##### COMMAND/ORGANIZATION:

Program Executive Office for Combat Support and Combat Service Support

##### TITLE:

Procurement specialist

##### YEARS OF SERVICE IN WORKFORCE: 35

##### DAWIA CERTIFICATIONS:

Level III in contracting; Level I in program management

##### EDUCATION:

Advanced Acquisition Program, Naval Postgraduate School; BBA, Northwood University

##### AWARDS:

2015 David Packard Excellence in Acquisition Award (as part of the Joint Project Office for Joint Light Tactical Vehicles); Achievement Medal for Civilian Service (2)

Katherine Parker's 35-year career in the acquisition workforce has spanned three wars and multiple humanitarian conflicts, as well as the budgetary ups and downs that are a perennial feature of any defense job. She has scrambled to procure drinkable water during Hurricane Katrina and fuel tankers during the wars in Iraq and Afghanistan. And four years ago, when the Joint Light Tactical Vehicle (JLTV) program, which she currently works for, was on the chopping block, she collaborated with the program team to explain why the vehicle was necessary.

"Often, people think I work for a defense contractor, and they don't realize the Army has a civilian workforce that purchases the goods and services for our Soldiers," said Parker. It's true that the work of acquisition professionals, civilian or military, is often invisible to the public. But after 35 years, it's clear that doing the behind-the-scenes work for Soldiers isn't just vital for Parker; as she said, "It's an honor."

#### What do you do in your position, and why is it important to the Army or the warfighter?

I'm a procurement specialist in the Joint Project Office (JPO) for JLTV. In addition to working with JPO leadership, product directors and the U.S. Army Contracting Command (ACC) during the program's engineering and manufacturing development phase, I also served as the procurement specialist responsible for overseeing all service contracting actions within the JPO. I worked on a Better Buying Power initiative to improve the effectiveness and productivity of contracted engineering and technical services by using TACOM's newly awarded multiple-award contract, known as the TS3 [TACOM Strategic Service Solutions], to competitively procure JLTV's contractor service support.

Working on the JLTV low-rate initial production contract and JLTV's service contracting efforts requires that I gather the program requirement, prepare a multitude of program documents and

act as a liaison between the program office and the ACC, which executes the requirement. By providing contracting expertise within the program office, I'm able to contribute to the acquisition streamlining efforts of the Army, which ultimately impacts our warfighters by getting them the supplies and services they need in a timely manner.

**How did you become part of the Army Acquisition Workforce, and why?**

I started my career in an administrative position and was quickly promoted into the contracting intern program upon completion of my bachelor's degree. I gained a great deal of knowledge in the contracting field while serving in the administrative position, often performing the duties of a contract specialist. It was a natural transition to move into the professional field of government contracting, where I was able to apply the knowledge and skills I gained acquiring my bachelor's degree. After serving as a contract specialist and receiving a good foundation in my chosen career field executing contracts, I was then promoted to a procurement specialist in the program management offices, working on tactical wheeled vehicles, bridging equipment and watercraft vessels.

**What do you see as the most important points in your career with the Army Acquisition Workforce, and why?**

Like many long-term employees, I had the distinct honor and pleasure of working directly for our Soldiers during three different global conflicts: Desert Shield, Desert Storm and the wars in Iraq and Afghanistan, where I was responsible for procuring urgently needed fuel tankers and armored kits, just to name a few. I'm honored to have contributed my acquisition expertise during humanitarian efforts such as Hurricane Katrina. I also worked with TACOM's Quick Response Cell to procure urgently needed armored vehicles for heads of state and to support Headquarters

Stabilization Force, Sarajevo. More recently, I have been privileged to work on the JLTV program, where I was able to gain Acquisition Category ID experience and see a program through Milestone B to Milestone C, in addition to working on a vehicle system that will ultimately save lives in the years to come.

I completed the Naval Postgraduate School's Advanced Acquisition Program in September 2003, where I gained valuable knowledge of the acquisition life cycle. This advanced program enabled me to see the bigger picture of a requirement from concept to fielding to disposal.

**What's the greatest satisfaction you have in being a part of the Army Acquisition Workforce?**

Having the opportunity to be a contributing member of the JLTV program. In 2012, the JLTV program was on the edge of being canceled, with [lawmakers on Capitol Hill] pulling the program funding. I worked tirelessly with a dedicated group of professionals to make sure that the legislative staffs and decision-makers in the Pentagon saw the value of the JLTV program. Now that the program has progressed through the life cycle milestones, knowing that the JLTV will provide added protection to Soldiers makes me proud of my contribution.

**What advice would you give to someone who aspires to a career or position like yours?**

Seek out developmental assignments outside your career path to gain a perspective from another part of the acquisition process. Also, work in a variety of different organizations to broaden your experience, which in turn will make you more multifunctional with much to offer an organization. Working in different organizations and going on developmental assignments will give you an idea of what area or programs you're most passionate about. Gaining a solid understanding of the principles in your career field will make you a valued and respected manager who others will seek for advice and mentoring. Make sure you have the foundational knowledge your job requires, and don't be afraid to accept instruction or recommendations from those above or below you. One day you might be supervising people, and if you don't know the foundation of that job, you'll be of no benefit to your employees or senior managers. After five years of being in the same job or office, it might be time to experience a different program, so don't be afraid to move out of your comfort zone—that's how we grow in our knowledge and expertise.

—MS. MARY KATE AYLWARD







### **DON'T INHALE**

Smoke obscures tents of the 1st Armored Division during a decisive action rotation in April at the National Training Center (NTC) at Fort Irwin, California. PEO C3T, responsible for fielding a tactical network that keeps Soldiers connected despite environmental challenges like low visibility, shops on the commercial marketplace to keep up with rapidly changing communication technologies. (U.S. Army photo by Pfc. Daniel Parrott, Operations Group, NTC)



# Network Marketplace: **OPEN FOR BUSINESS** *and Growing*

PEO C3T keeps up with rapid technological changes by taking a competitive approach to buying the latest commercial products so that it can get the best to Soldiers faster.

*by Mr. Joe Welch, Lt. Col. Jack “Shane” Taylor and Mr. Michael Beery*

**F**or years, the Army pursued communication systems the same way it developed tanks—fielding a “big bang” capability intended to last for decades. But with today’s exponential progress in information technology, the Army’s network strategy has shifted from revolutionary to evolutionary—continuously building on the latest models with faster, stronger and more powerful capabilities. Think of the latest version of a smartphone, or the most recent model year of a car.

Now that the Army can leverage the latest commercial technology while still executing integration, interoperability and fielding, the emphasis has shifted to competition, whenever and wherever possible.

Taking a nondevelopmental item (NDI) competitive approach, the Army’s first prominent application was in tactical radios, which enabled the competitive acquisition of the latest radio technology that met specific requirements and was compatible with

government-owned waveforms. (See related article, “To a Network Marketplace,” Army AL&T magazine, April-June 2015, Page 46.)

In essence, the NDI approach opened the radio marketplace.

Now, the Program Executive Office for Command, Control and Communications – Tactical (PEO C3T), responsible for fielding the Army’s tactical network, is expanding that concept across its portfolio. This approach broadens and deepens the PEO’s partnership with industry, which is now invested earlier and more often in the process of system development.

## **EVOLVING THE RADIO MARKETPLACE**

The Army continues to advance its next-generation, software-defined radios, which act like minicomputers and enable Soldiers to stay connected even in the most austere and remote locations.



#### SHOOT. MOVE. TALK.

A Soldier from the 101st Airborne Division, wearing a portable, tactical radio, prepares his next move during a live fire rehearsal in April at the Peason Ridge Training Area of the Joint Readiness Training Center, Fort Polk, Louisiana. Soldiers at the team, squad and platoon levels carry handheld Rifleman Radios, some of which will be procured under contracts awarded by the Army in April 2015 to Harris Corp. and Thales Defense and Security Inc. (U.S. Army photo)

Over the past three years, as more and more radio vendors successfully loaded government-owned waveforms onto their new radio platforms, the Army implemented its radio marketplace acquisition approach, which aims to lower costs and deliver radios more quickly using NDI products. This approach, which was approved by the Office of the Secretary of Defense, relies on industry to provide already developed, mature radios that can meet specific requirements and are compatible with government-owned waveforms.

Using the NDI strategy, radios will be fielded more quickly and at a lower cost, since vendors do not have to create their own waveforms. Instead they will use existing waveforms from the Joint Tactical Networking Center Waveform Information Repository. With government-owned waveforms, vendors can focus on developing their radio hardware and pushing technology forward, and it ensures interoperability across the services, since the Air Force, Navy and Marine Corps can use Army-developed waveforms.

Recent examples of successful NDI competitions include the Army's contract

awards to multiple vendors to procure the Manpack and Rifleman radios after full and open competition. The Army worked closely with industry to refine requirements by hosting industry days and one-on-one forums, allowing vendors to ask questions and gather information. Meeting with various vendors enabled the Army to learn about new technologies in the commercial environment. It also meant vendors were tied into the development process sooner than ever before.

Now that contracts have been awarded for the Manpack and Rifleman radios, qualified vendors will compete for smaller-quantity delivery orders on a regular basis to fill the hardware requirements, while using existing government-owned waveforms that are maintained in the Waveform Information Repository. This structure enables the Army to choose from numerous technologies and to release a new contract if radio technology changes significantly after the initial contract award.

Vendors whose technologies mature after the initial competition and operational tests can join the competition, and vendors that do not pass qualification testing will be removed. The consistently

competitive acquisition strategy is expected to reduce radio procurement costs as the Army continues to modernize the network amid fiscal constraints.

PEO C3T's project manager for tactical radios (PM TR) is employing a similar construct for future procurements. This includes the potential development of a two-channel Rifleman radio and airborne radios.

While the Army procures the next generation of software-defined radios using the radio marketplace, it is also evolving the software waveforms, which provide the link for the radios to communicate. These networking waveforms are integral to continuously improving the Army's tactical communications network by connecting to network infrastructures, such as Warfighter Information Network – Tactical (WIN-T).

#### BUILDING TO A COMMON, PREDICTABLE ENVIRONMENT

Perhaps the best fit for the marketplace concept is with mission command—where stand-alone, hardware-based systems are already beginning to be replaced by software applications.





The process of modernizing mission command systems by transitioning away from a major contract award to a smaller, more agile award strategy comes at the same time the Army is embracing the Common Operating Environment (COE) as a way to drive competition. This “app store” approach to development brings a standardized and open computing environment and is changing the way mission command capabilities are created. Through the command post computing environment (CP CE), part of the COE, software development kits will allow third-party contributors to build tactical applications, similar to how apps are built for smartphones.

This could improve opportunities for small businesses to participate in competitions. Aimed at attracting innovative software-based solutions, maintaining a reference architecture is key, because it enables vendors to build against a requirement following a set of standards. CP CE is helping to drive common, cross-cutting capabilities across warfighting functions and “widgetizing” the command post with web-based apps.

Leveraging a government-developed infrastructure that is well-known and understood, then defining standards to support that effort, provides a predictable environment so a wider array of developers can deliver products more quickly.

### THE APP APPROACH

This shift toward tactical applications, or TacApps, is where industry collaboration and a single architecture environment work together. Currently, commercial, mobile operating systems like iOS and Android have provided software development kits that have enabled nearly anyone to build an application into their marketplace. The acquisition efforts of PEO C3T’s project manager for mission



### URBAN COMMUNICATION

Soldiers from the 1st Armored Division use the Manpack radio, which can be mounted in a vehicle or carried in a rucksack. A marketplace approach to acquisition shifts the Army away from big one-time procurements and toward the kind of incremental evolution that smartphone companies use to keep their products up to date. (U.S. Army photo)

command (PM MC) will mirror that environment, enabling companies large and small to develop applications that can run on an established framework.

This approach forces the government to be more disciplined with specifications while allowing for more competition from organizations traditionally outside of the DOD arena.

In essence, it gives PM MC the opportunity to leverage innovation from industry while ensuring competition in future capability development, enabling any business—no matter how large or small—to compete and resulting in cost savings for the Army.

One initiative in support of mission command modernization, under this

acquisition model, involves the standard and shareable geospatial foundation. The program office plans to issue a competitive task order (TO) through a blanket purchase agreement for industry to bid on. Vendors will be able to compete at the TO level, allowing the government to award an effort quickly.

In the past, a major award to a single vendor serving as the lead systems integrator would take many months. With the new marketplace model, PM MC has reduced the time frame by 80 percent, from several months to weeks. This method also injects much-needed flexibility into the contracting process.

Work packages assigned to project managers are mapped to a task or delivery order and integration is done on-site



## TACTICAL APPS

By allowing third-party contributors to build tactical applications, the command post computing environment promises to expand opportunities for small businesses to participate in competitive procurements by enabling them to build to a clear set of standards. (Photo by PEO C3T)

in laboratories or in the Defense Intelligence Information Environment, the online collaborative environment for industry partners to execute TOs.

Project managers will now be responsible for managing integration of a capability coming from different vendors. But with government serving as part of the technology solutions, product managers can start to drive toward an open architecture and set themselves up early in the process to understand transitions in sustainment and how they'll handle security requirements.

## MOVING BEYOND THE RADIO MARKETPLACE

Realizing that the NDI concept could be applied across the PEO C3T portfolio, project managers began to look at other innovative acquisition models for their portfolios. Nowhere was this a better fit than with its on-the-move tactical network, WIN-T.

WIN-T enables commanders and Soldiers to pass critical voice, video and data across the formation and while on the move. WIN-T is made up of many parts; by applying the marketplace concept,

the Army can maximize the benefits of emerging technology by inserting competition in new ways.

## LEVERAGING SBIR

One way to leverage competition from the commercial marketplace is through the use of Small Business Innovation Research (SBIR) contracts. The Army recently awarded a contract to GATR Technologies for its inflatable antenna system to satisfy the early-entry satellite communications (SATCOM) system known as the Transportable Tactical Command Communications (T2C2), part of the WIN-T system. This new duo of lightweight, portable satellite terminals will provide early-entry units in air-to-land missions, as well as follow-on units at the tactical edge, with a light and heavy variant of high-bandwidth, deployable satellite dishes to keep Soldiers and commanders connected to the network and well-informed.

The SBIR program's three-phase competitive process allows proposals to be submitted in response to DOD's emerging requirements. SBIR significantly reduces risk through reusing testing and logistics data from other services. It also

creates an environment that allows the quick adaptation of commercial hardware and software while opening up new markets to small businesses.

In a separate effort, the PM for WIN-T is able to apply innovative solutions by using the DOD-wide Global Tactical Advanced Communication Systems (GTACS) contract, which it manages. (See "Innovation Through Competition.") The GTACS contract was used recently to improve the marketplace for the Army's new and developing Pseudolites program. This program enables the continued operation of positioning, navigation and timing-enabled systems such as Blue Force Tracker, the Army's premier friendly force positioning system, in electronically or physically challenged environments. Pseudolites provide a terrestrial radio navigation similar to satellite GPS for GPS-denied environments.

Under the GTACS contract, the Army competed a limited-rate production for pseudolites, choosing two vendors that are going head-to-head to develop the most innovative, cost-effective solution to fill this unique requirement. The victor will conduct the full-rate production.



## CONCLUSION

To keep pace with today's rapid evolution in technology, the Army is growing the cadre of tools it can use to get new capabilities into the hands of Soldiers. This new network marketplace concept builds on lessons learned while instilling an atmosphere that encourages trying new approaches in acquisition and embraces competition as never before.

For more information, go to PEO C3T's website: <http://peoc3t.army.mil/c3t/>.

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## INNOVATION THROUGH COMPETITION

As Army network contracts for GTACS and CHS-4 expire, PEO C3T builds in provisions to support rapid acquisition of innovative technology.

As part of its continual network modernization, the Army is looking for products that significantly increase capability; reduce system complexity to make the network easier to operate and maintain; and decrease size, weight and power—all at a fair price to the taxpayer.

Part of the Army's strategy to meet these requirements includes promoting competition as a catalyst for industry to think outside the box and drive invention. In that light, as two of the Army's main network contracts, GTACS and Common Hardware Systems (CHS)-4, near expiration, the Army is preparing to compete new versions that are expected to increase efficiencies, promote competition and spur innovation.

### SPEEDIER PROCUREMENT

These two competitive contracting mechanisms, both managed by PEO C3T, will serve to expedite innovative technology and smartly enable rapid acquisition. The new GTACS II contract is being designed to promote product



### ACQUISITION CAPABILITY IN HAND

A Soldier uses a CHS ruggedized handheld device in the field. The CHS contract enables a one-stop, rapid acquisition capability for modified commercial information technology hardware. (U.S. Army photo)





## BEFORE THE DEAL

The Army hosted a pre-solicitation day for the GTACS II contract on March 4 at Aberdeen Proving Ground, Maryland. Used recently on the Army's nascent Pseudo-lites program, GTACS II aims to get new technologies to the field more quickly. (U.S. Army photo by Amy Walker, PEO C3T Public Affairs)

innovation and provide the best capability possible for Soldiers at competitive prices. The contract provides one-stop shopping for a broad range of C3T hardware and services, with an emphasis on tactical satellite communications. Among its many benefits, GTACS II is expected to significantly reduce delivery times and provide greater opportunities for small business.

GTACS II is a 10-year, \$6 billion, multiple-award, indefinite delivery, indefinite quantity (IDIQ) contract for the rapid acquisition of a wide variety of tactical C3T hardware, software, and engineering, logistics, test and system-related support services. The contract enables the customer to design a capability, then produce, test, field and sustain that capability with one contract. It simplifies and consolidates the entire process across the product life cycle.

The goal of GTACS II is to establish a set of qualified vendors who can quickly respond to requests for proposals on delivery and task orders with the potential to be awarded in 120 days, enabling the Army to provide

critical capabilities to the field at an accelerated pace. To achieve this decreased timeline, the program office, in union with the U.S. Army Contracting Command, will be instituting standardized documentation and processes, which should significantly decrease review cycles and establish a one-team approach to the entire contracting process.

The source selection process will result in an award to about 30 prime contractors that will be able to compete for the broad spectrum of work under the contract. Each delivery order will be an opportunity for industry to promote product innovation, provide the optimum resolution of requirements and deliver the best overall value for the Army and DOD. Of the approximately 30 contracts, the Army expects roughly a third to be awarded to small businesses, with a percentage of that set aside for women- and veteran-owned and disadvantaged or underutilized small businesses.

The GTACS II contract increases the number of prime contractors from 20 to 30, which is anticipated to increase

competition. This also could result in more innovative solutions at a fair market value being bid on its requirements. GTACS II also will allow more small businesses to participate in competitions—10 instead of the current six.

The GTACS I contract expires in October 2017. Under the current timeline, the Army expects to issue the final request for proposal in November 2016, with contracts awarded in October 2017.

While the GTACS contract supports new requirements development and full systems integration, including hardware, software and services for tactical network systems such as ground satellite terminals, the CHS contract enables a one-stop, rapid acquisition capability for modified commercial information technology (IT) hardware.

### CUTTING-EDGE INFORMATION TECHNOLOGY

CHS provides state-of-the-art computing and networking equipment that improves connectivity, interoperability, logistics and maintenance support to Soldiers, and is available for use by all DOD and federal agencies. Designed as a rapid execution vehicle to meet tactical requirements, the CHS contract supports Army and DOD programs that require increased ruggedness, configuration management, end-of-life configuration changes, and hardware to meet an operational need; or that do not have well-defined requirements.

Valued at more than \$3 billion, the CHS-5 contract will enable the rapid procurement of total life cycle system management solutions in support of tactical programs. The contract's consolidated acquisition approach can design, develop, modify, ruggedize, environmentally test, procure, support and provide configuration management for commercial IT hardware systems, all made available via a single contract action and a single part number.

The program structure for CHS-5 includes a single-step, full and open competition, leading to a best value award of an IDIQ contract for a five-year period of performance (a three-year base with two one-year options). Much of the CHS-5 contract is focused on enabling supported programs to develop life cycle sustainment plans for commercial IT during the hardware procurement phase.

As the commercial industrial base adapts to fit a leaner Army, the organic industrial base will be called upon to provide more holistic life cycle sustainment support. The CHS-5 contract will require vendors to establish a public-

private partnership with Tobyhanna Army Depot, Pennsylvania, to facilitate product support for programs procuring hardware via CHS-5 and having core logistics capability requirements. This partnership leverages the innovation, resources and leadership skills of both Tobyhanna and CHS to provide the best value to the warfighter.

Since its launch in 1987, the CHS program has provided a consolidated acquisition approach for tactical technology solutions, offering economies of scale and complete life cycle management and warranty for hardware of all sizes and varying levels of ruggedness. Combining a prime contractor with options for small business procurement and Army organic support, CHS, as part of PEO C3T, serves as a broker uniting Army programs with the technologies that meet their requirements.

The rapid execution of the contract is what makes CHS valuable to the Army. CHS coordinates with multiple programs to facilitate efficient procurement and sustainment of hardware items across the Common Operating Environment, while leveraging industry innovation to supply the latest technologies to Soldiers. This holistic approach to Army tactical hardware resulted in a cost avoidance totaling \$205 million in FY15.

The current CHS contract, CHS-4, ends in August, and on the current timeline the Army expects to issue the final request for proposal in September, with contracts awarded in December 2017.

### CONCLUSION

As the Army continues to modernize its tactical communications network, GTACS II and CHS-5 will provide competitive contracting mechanisms to facilitate the acquisition of innovative technology and service solutions, thus helping the Army retain its military dominance on the battlefield.

For more information, email **usarmy.APG.peo-c3t.mbx.pao-peoc3t@mail.mil**; for more information about GTACS, email **usarmy.apg.peo-c3t.mbx.pm-win-t-gtacs@mail.mil**.

—MR. JAMES SAWALL, *assistant product manager, Commercial Satellite Terminal Program*, and  
MR. BRECK TARR, *product lead, CHS*



#### WHAT'S ON YOUR MIND?

Projects for which the program management office, the functional proponent and the system integrator are all in different locations are especially vulnerable to the effects of bad communication. If staff can move to work in the same office, they should. (SOURCE: DrAfter123/iStock)





# GROUND TRUTH

Analyses of alternatives and industry days foster collaboration between government and industry, forming stronger relationships, improving program schedules and reducing acquisition costs.

*by Ms. Jill Iracki*

The Army engages and partners with industry throughout the entire acquisition life cycle, from conducting market research and assessing materiel solutions to providing system support and sustainment. For instance, the Army acquisition community interacts with industry in preparation for analyses of alternatives (AoAs), which evaluate the performance, operational effectiveness and suitability, and estimated costs of potential materiel solutions to mitigate capability gaps defined in requirement documents. Industry days allow the government to present plans and solicit feedback on the initial requirements, goals and schedule for an acquisition program. Activities such as these allow better information sharing as the government and industry collaboratively refine requirements and discover what can be achieved. As a result, the two entities are able to form stronger relationships, improve program schedules and reduce acquisition costs.

Through the Acquisition Lessons Learned Portal (ALLP), the Army acquisition community shares lessons that pertain to all aspects of executing programs, including collaborating and engaging with industry. Sharing these lessons learned throughout the Army acquisition enterprise allows acquisition professionals to benefit from the experiences and knowledge of project management office (PMO) staff and other stakeholders. Following are lessons learned pertaining to military-industry collaboration, including preparing for AoAs, fostering better relationships and sharing knowledge, promoting competition and maintaining collaboration.

## BETTER-INFORMED ANALYSES

**LL\_99: Reduce the time spent performing information discovery and creating intelligent, pertinent questions, as well as background guidance, for AoAs through legal, face-to-face interaction with industry vendors.**

### *Background*

For AoAs and similar studies, the U.S. Army Materiel Systems Analysis Activity (AMSAA) typically relies on information from program managers (PMs) and the U.S. Army Training and Doctrine Command, industry responses to requests for information (RFIs), government testing and research labs, and internal subject matter experts. For one AoA regarding a radar technology application, AMSAA reached out to industry vendors to evaluate the validity of a technology restriction mandated in a helicopter protection system RFI prior to the AoA.

AMSAA discovered that industry not only could provide input on the issue regarding cross-agency politics and legacy doctrine, but was also able to shed light on the performance, costs, analysis tools and theory behind several solutions. These solutions included some with and without the technology restriction, which enabled AMSAA to build a case for why the exclusion of the given technology was unreasonable. (The exclusion was later found to be an oversight on the part of the agency that crafted the original RFI questions and supplemental background.) Industry input also enabled AMSAA to approach more vendors and PMs with intelligent and relevant questions to separate the salesmanship, assumptions and politics from the unbiased truths and facts. AMSAA discovered that vendors often misinterpret questions and sometimes omit pertinent information because the government has not supplied enough background information. In the hopes of getting better responses, the AoA lead sometimes chooses to issue another written RFI, which uses valuable time and vendor resources. Or, the AoA lead may choose to rely on a subject matter expert's judgment, which may simply be a best guess. AMSAA also has found that one set of questions does not work well for soliciting solutions in which different kinds of technologies or technology mixes may be brought to bear.

*Industry days allow the government to present plans and solicit feedback on the initial requirements, goals and schedule for an acquisition program.*

### *Recommendation*

Before developing questions or providing background information, engage with interested industry vendors to discover relevant questions to ask, potential technology combinations and how vendors design their systems (proper design-to requirements for every potential technology or technology mix). Also, gather feedback from industry that could help in crafting questions and background information in the future. Evaluate the validity of any technology restrictions mandated in the RFI or request for proposals (RFP) by engaging vendors of excluded technologies to determine if their exclusion is in the best interest of the warfighter.

Adopting these measures will help reduce the cost of conducting an AoA, since tools and processes could be preplanned and available, and could help reduce rework necessitated by the use of improper examination tools. These measures also could help reduce the time for obtaining information through RFIs and increase the quality of information obtained, while preventing legacy decisions from hampering innovative technology solutions.

## SHARING KNOWLEDGE EQUALLY BUILDS LONG-TERM RELATIONSHIPS

**LL\_51: Maintain clear and open lines of communication with industry to build trust and a solid relationship and to facilitate knowledge transfer.**

### *Background*

One PM actively engaged industry in preparation for the engineering and manufacturing development (EMD) phase. Through various forums, the program provided avenues for industry to review and respond to the draft requirements, schedule, funding profile and procurement package that the program solicited to build EMD prototype systems.

The PMO held an industry day to inform industry of the government's intent for system development; to give an initial look at the requirements, the draft acquisition plans and near-term path forward; and to obtain feedback from industry. After the program released a draft RFP, industry was invited to one-on-one

meetings with the government as an opportunity to ask questions and provide more comprehensive feedback on the draft RFP requirements. Six potential vendors met with program representatives and expressed their concerns about funding, source selection, their ability to meet program requirements and contract data requirement lists.

The PMO later held a joint industry day to identify requirements that could be adjusted to yield cost savings while only moderately affecting system performance. Eleven teams of potential prime vendors for the EMD phase attended the event and provided input on the schedule and threshold requirements that would need to be adjusted to meet the targeted cost. Through these industry days, industry helped the PM validate the program schedule and requirements.

Openness and consistency in exchanging information, ideas, recommendations and solutions, combined with the industry days, created an environment of trust and willingness to work together between the PMO and industry. Additionally, early involvement of potential EMD offerors accelerated proposal development and yielded better offers.

#### *Recommendation*

The PMO should maintain clear and open lines of communication with industry and make a concerted effort to inform industry of any changes in requirements. In addition to facilitating knowledge transfer, strengthening relationships and ensuring that requirements are concise and understood by industry, this collaboration can benefit other programs about to embark upon a competitive phase by:

- Informing industry of potential contracting opportunities for the next life cycle phase.



#### **KICKING OFF A BACK-AND-FORTH**

Maj. Gen. Bruce T. Crawford, commanding general, U.S. Army Communications-Electronics Command (CECOM), delivers opening remarks April 12 to more than 100 business representatives at the second annual industry day at Tobyhanna Army Depot, Pennsylvania. An industry day plays an important part in keeping the lines of communication open with vendors—though it's just the start. (Photo by Greg Mahall, CECOM Public Affairs)



#### **EARLY INTERACTION INFORMS REQUIREMENTS**

Engineers from the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC) engage representatives from industry, academia and other government agencies during the 2015 Ground Vehicle Systems Engineering & Technology Symposium in Novi, Michigan. This advance planning briefing clues industry in to the community's interests, requirements and needs for upcoming projects. (Photo by TARDEC Public Affairs)





#### COMPETITIVE PROTOTYPING CAN LOWER COSTS

Shown here is the Joint Light Tactical Vehicle (JLTV) produced by Oshkosh Truck Corp., one of the vendors for the JLTV program's EMD phase, along with AM General LLC and Lockheed Martin Corp. Among the Army's lessons learned on collaborating with industry is to consider having multiple vendors compete to build prototypes during the EMD phase. Even though this is likely to require more government time and money up front, it has lowered costs across the life cycle of at least one program. (U.S. Army photo)

- Allowing the PM to assume control of communicating program requirements to lessen rumors, untruths and third-party feedback.
- Allowing early industry buy-in.

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#### **LL\_230: Programs are most effective in working with vendors when a program adopts practices and expectations that are familiar to vendors.**

##### *Background*

When a program is acquiring commercial items, vendors can be strategic partners. Relationships with key vendors can take many forms. One program adopted a rule to resist modifications to selected commercial items and asked the vendor to make a change only if it made sense commercially. The vendor checked on the viability of any enhancements by asking other buyers. This program was able to influence, rather than direct, the vendor. Other programs found that including vendors as part of integrated product teams helped foster a more trusting partnership among the vendor, contractor and PMO.

The relationship between the program and the vendor is, in most instances, very different from the relationship with a contractor, and PMs frequently overestimate the impact they can have on vendors. While contract incentives shape the relationship with a contractor, the vendor is selling a product—not program-unique services. However, programs have been successful in influencing product changes. In one case, a program worked as part of a users group to influence other customers to support changes needed by DOD, and the vendor implemented the widely supported changes. On the other hand, some PMs have been convinced that changes to commercial items would be included in subsequent commercial releases. In several cases, the custom enhancements never became part of the commercial item; the PMs had to choose whether to maintain a unique version of the commercial item or redesign the system without the modifications.

##### *Recommendation*

To strengthen program, contractor and vendor relationships:

- Verify vendor and contractor claims for commercial items.
- Verify the availability of commercial items.

- Determine whether the acquisition strategy can be modified to better suit the unique commercial aspects of the system in question.
- Use contract incentives to encourage appropriate relationships.
- Maintain close relationships with vendors to maximize improvements and avoid surprises.

## PROMOTING COMPETITION

**LL\_983: Maintaining open communication with industry can allow vendors that were not a part of technology development to develop their own designs and promote competition for the EMD phase.**

### Background

One program found that competition among multiple vendors during the EMD phase allowed costs to be minimized as the vendors competed for the low-rate initial production contract in a fiscally constrained defense environment. This approach gave the government leverage to reduce system cost and potentially obtain system support deliverables, such as data rights, that may not typically have been offered at reasonable costs. Overall, the PMO attributed the program's success in meeting performance, cost and schedule requirements to the competition among the multiple vendors despite the restrictions and difficulties it imposed on the program. (Having three vendors compete to build prototypes in the EMD phase tripled the cost of selecting a vendor—but with the expectation that it would result in lower costs later in the program's life cycle.)

### Recommendation

To promote future competition, program offices should release requirement documents and portions of the acquisition strategy widely, not just to the vendors

under contract. This will allow vendors to make informed decisions in order to be positioned for future procurement. Sharing information regularly builds a solid relationship with industry and keeps it informed of the program's intent.

## MAINTAINING COLLABORATION

**LL\_1072: The PMO, contractors and the functional proponent should operate as an integrated team and collaborate as much as possible while maintaining appropriate boundaries.**

### Background

One program faced challenges with poor communication and coordination among the PMO, the functional proponent and the systems integrator (SI). This needed to be resolved for the program to be executed successfully. The functional and acquisition roles were not clearly defined, and there was a clear delineation as well as physical separation of functional proponent, PMO and contractor personnel.

Staff from the PMO, SI and the functional proponent were physically co-located so they could work together and communicate more freely, allowing tighter collaboration. The relationship between the government and contractor was revamped to include regular interaction and collaboration, including daily sync-up meetings between the PMO and SI leadership. Rules of engagement and policies were still in place, but the three entities were integrated into a well-functioning team working toward a common goal.

Because the contractor did not have an experienced test manager on staff, the PMO had difficulty getting information on the SI's test strategy. The PMO added language to the contract pertaining to

the PMO and SI working together on testing. They combined staffs to create a more robust test team, with the government leading the test effort and the contractor executing. Test implementation greatly improved as a result.

### Recommendation

Ensure that personnel across the three entities—PMO, contractor and functional proponent—can work together collaboratively. Staff working on similar areas of the program ideally should physically sit and work together, and the PMO should ensure that there are no communication barriers to prevent the three entities from functioning as an integrated team. And, although close collaboration is imperative, boundaries still need to be acknowledged to ensure that the functional proponent does not exceed its responsibilities. Ensure that the roles of each party are well-defined and understood.

*For more information on these and other Army lessons learned within the ALLP, go to <https://allp.amsaa.army.mil>; Common Access Card login required. Recent lessons pertaining to communicating with industry, market research and industry days can also be found in the Ground Truth article in the January – March 2016 issue of Army AL&T.*

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## READY TO GO

Pvt. William Blanset, an indirect fire infantryman with the 7th Cavalry Regiment, prepares to drop a 120 mm mortar round during an April training exercise at Grafenwoehr Training Area, Germany. A pilot program involving the 120 mm round incorporated a new approach to direct commercial sales that protected government IP rights but still allowed access to government technical data. (U.S. Army photo)







# OPENING *International* MARKETS

It's usually a good thing when the U.S. government retains the intellectual property rights for weapon systems and technologies. That can, however, prevent U.S. companies from competing to sell to foreign governments. With a cooperative research and development agreement and a letter of the government's intent to provide technical data, international markets open to U.S. industry and allies' equipment is more interoperable with U.S. equipment.

*by Mr. John Irizarry and Mr. Peter Burke*

**T**here is little doubt that sales of U.S. military equipment and ammunition through foreign military sales (FMS) or direct commercial sales (DCS) is big business. According to the Defense Security Cooperation Agency, FMS in FY15 topped \$35 billion, a \$4 billion increase over FY14. Some available data suggest that DCS are on the order of two to three times these annual amounts. These sales represent a boon to defense contractors, a critical stabilizer for the U.S. defense industrial base and a strategic benefit to U.S. partner nations.

However, there are several barriers to increasing these sales beyond current levels. This article examines two of these barriers and discusses a prototype program to improve U.S. defense competitiveness implemented by a cadre of defense organizations, including the U.S. Army Research, Development and Engineering Command's Armament Research, Development and Engineering Center (RDECOM-ARDEC) and the project manager for combat ammunition systems (PM CAS) within the Program Executive Office (PEO) for Ammunition.

## **POLICIES LOCK U.S. CONTRACTORS OUT OF FOREIGN COMPETITIONS**

As in the United States, many countries have implemented statutes and regulations regarding the competitive acquisition of defense-related products. These competitive rules may be set aside in cases where technologically advanced weapons and munitions can be purchased from only one source. However, in many areas, such as conventional ammunition and weapons, countries routinely use these competitive practices to ensure the lowest price for products. In these cases, nations will use a request for tender (RFT), request for proposal (RFP), request for quote (RFQ) or other contractual processes designed to promote competition.

Responses to these requests through a proposal are typically required within one to three months. The FMS system requires reviews from many government stakeholders to assure a complete and correct response, and depending on the complexity, it can take many months to complete.



### DOUBLE-BARRELED

Soldiers of the 7th Cavalry Regiment load 120 mm mortar rounds in April at Grafenwoehr Training Area. The 120 mm mortar cartridge was part of a pilot test for a new approach to sales to allies. This approach, developed by PM CAS and ARDEC, yielded two contracts that represent a combined revenue of roughly \$25 million. (U.S. Army photo)



### SOUND OF OPPORTUNITY

U.S. paratroopers from the 173rd Airborne Brigade work on setting up an M777 howitzer in March at Grafenwoehr Training Area. The propellant used to fire the howitzer was part of a recently piloted approach to foreign sales aimed at strengthening the U.S. industrial base by creating new opportunities for ammunition suppliers. (U.S. Army photo by Spc. Elliott Banks, Training Support Activity Europe)

A second barrier can be government intellectual property rights (IPR). The United States has rightly fought to maintain its competitive advantage in its government-based research, development, test and engineering capabilities. U.S. government research and development centers continue to innovate and drive the pace of defense-related technologies at a furious rate, giving our troops a lethal advantage. This development model frequently results in the U.S. government funding and owning the IPR for many of the products in its arsenal.

While this approach has many advantages, it does create a significant obstacle to opportunities. U.S. defense contractors cannot use government-owned technical information without permission, and seeking this permission through the typical DCS system can be daunting and far exceed typical RFT/RFP/RFQ response times. This leaves many U.S. defense contractors unable to respond to opportunities to make profits.

During the Feb. 3, 2012, Industrial Committee of Ammunition Producers (ICAP) meeting, industry expressed concern about its inability to compete internationally. PM CAS agreed to research legal approaches and pilot an effort to improve international competitiveness. What we needed was an approach that would protect the government's IPR while allowing access to government technical data to support these rapidly moving foreign competitions.

### CRADAS REPRESENT A NEW WAY THROUGH

We worked very closely with ARDEC at Picatinny Arsenal, New Jersey, in researching how we could help. We found DOD Instruction No. 5535.8, dated May 14, 1999, Subject: DOD Technology Transfer Program, which stated,

“Cooperative research and development agreements (CRADAs) should be used whenever possible to expand capabilities for R&D and to transfer technology developed jointly or independently to enhance both defense capabilities and the civilian economy.” With the help of legal counsel and stakeholder alignment, we developed a notional strategy using the CRADA approach and presented it to the deputy assistant secretary of the Army for defense exports and cooperation, HQDA G-4, PEO Ammunition, Joint Munitions Command’s Security Assistance Management Directorate, the U.S. Army Materiel Command and RDECOM for their concurrence.

Under the proposed CRADA approach between industry and ARDEC, a U.S. defense contractor could submit a request for government support in an upcoming foreign competition and request a letter of intent (LOI). This government LOI documents the terms, conditions and level of government engineering support that would be provided under the CRADA for this opportunity. Under these terms, the government would provide the technical data (such as drawings and quality documents) required for production as well as the engineering and configuration management expertise to modify existing U.S. designs to meet local foreign requirements (such as marking and packaging).

Under this approach, the government always maintains configuration control, thus protecting its valuable IPR and maintaining interoperability with allied and friendly nations. Further, in coordinating the LOI with other government agencies, the foreign interests of the U.S. government are preserved. With the LOI in hand, a defense contractor is, in most cases, able to respond to a foreign competition. Following a successful LOI, the

work of implementing a CRADA to support the foreign opportunity can begin, typically in parallel with proposal submittal. Under some circumstances, U.S. defense contractors can also request an advanced copy of the technical data with the LOI when it is required to generate a proposal. Under the terms of the LOI, the defense contractor must still comply with all International Traffic in Arms Regulations.

### CONDITIONS FOR DOING BUSINESS

One of the major conditions of this approach is that the government will consider a DCS opportunity with industry only when FMS is not a viable option; for example, if the country chooses to request a DCS approach over FMS because of an urgent need or other internal preference. The purpose of this approach is not to eliminate or reduce the use of the existing FMS process, but to complement the FMS approach by providing additional opportunities for the U.S. industrial base.

The second major condition is that the government will only support industry partners that bid on DCS opportunities who have an LOI and CRADA mechanism available during the bidding process. This allows the appropriate government authorities to review the prospective bid opportunities and determine compliance with U.S. strategic industrial objectives prior to issuing the LOI.

### PILOT PROGRAM LEADS TO TWO WINS

With the support of the process stakeholders, we executed a pilot program to demonstrate this approach, measure its success and better understand potential improvements. Two applicable opportunities were selected. One of these was an RFQ for an artillery propellant charge for firing a 155 mm round from an M777



### TARGETING A NEW APPROACH

The FMS system often moves too slowly for the rapid response requested by countries looking to acquire defense items, boxing U.S. industry out of valuable business opportunities. CRADAs and government assurances to provide required technical data open these opportunities back up. (Photo courtesy of PEO Ammunition)

howitzer, and the second was an RFP for a 120 mm mortar cartridge. These two opportunities provided a good basis for evaluation and fit neatly within the definition of applicable programs: Both are in production for DOD customers, so the DCS order can be added to the ongoing efforts.

The government generated an LOI along with the required level of engineering support and legal language (such as on limits of liability and government IP assertion). The CRADA allowed the government to be funded for providing technical support and access to technical data, and the license agreement that was signed with each CRADA allowed the government to receive some financial return on





### HEADS UP DOWNRANGE!

Soldiers with the 7th Infantry Division send a round downrange in February during a combined arms exercise at Yakima Training Center, Washington. An RFQ from an ally for an artillery propellant charge for firing a 155 mm round from an M777 howitzer made a good test case for the recently piloted approach to foreign sales because the propellant charge was already in production for DOD customers. (U.S. Army photo by Sgt. Cody Quinn, 28th Public Affairs Detachment)

commercial use of its inventions. (Royalties from the licensing of government employee inventions can be used to seed new research, foster scientific exchange, award government employee innovators and other valuable purposes.)

The government provided the LOIs to the requesting contractors, and the contractors submitted their proposals. In both cases, the U.S. contractor won the competitively awarded contract. These contracts represent a combined revenue of about \$25 million. It's admittedly a small start, but an opportunity that otherwise would not have been realized without the CRADA-DCS approach. Further, based on feedback from the U.S. contractor who has established a relationship with the foreign purchaser, these sales established a pattern of buying that is expected to lead to recurring sales of approximately the same magnitude over the next five years.

### LESSONS LEARNED FROM THE PILOT

1. Buying inventory from stock: In a DCS case, industry initially believed that it could buy directly from U.S. inventory. However, after checking with the Joint Munitions Command, we learned that there is no process in place for this approach. Munitions

bought via DCS need to be from new production.

2. Courses of action when the industrial base is not producing an item or component for a DOD customer: The government will assist the contractor with technical services through the CRADA to requalify an old source or find a new source that will be able to make the part to the government's technical specifications.
3. Communication: As with any new effort, all stakeholders (industry and government) need to be on the same page at the outset of the agreement and throughout the effort. Frequent integrated product team meetings were established to get through the pilot efforts, and improvements to the process were documented in the operating procedures.

### CONCLUSION

The goal of this program, strengthening the U.S. industrial base by opening up new opportunities for ammunition suppliers, was achieved in the successful outcomes of the two pilot efforts. PM CAS has developed a draft standard operating procedure (SOP) that documents the roles, responsibilities, process (including intra-government coordination), applicability,

limitations, LOI formats (including legal statements) and timelines associated with the CRADA-DCS process. This SOP is currently with PEO Ammunition and ARDEC for review and staffing. It is anticipated that it will be approved and implemented across PEO Ammunition by the end of the third quarter of FY16.

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# The *EXPORT* Factor

Industry wants to make products that appeal not just to the U.S. military but to international customers as well. The Army should help make that happen. The unit cost of acquisition goes down, the capability of allied forces goes up and cooperation gets easier.

*by Maj. Kenneth B. Fowler and Mr. Jacks George*



## PGK FUZE

A German DM111 projectile equipped with a PGK fuze. (Photos courtesy of Training Support Center Grafenwoehr, Germany.)

**W**here will defense companies focus their efforts in order to generate maximum revenue as the United States cuts the defense budget? Exports.

Exportability is a major pillar in program development that strengthens the industrial base and benefits the U.S. Army by reducing unit production cost through economies of scale. With budget reductions and ongoing conflicts around the world, it is of paramount importance that the United States promote U.S. and allied cooperation and maintain overmatch capabilities. The Army's security assistance programs—which encompass sales and exports of defense items such as helicopters, missile systems and communication technologies—are key enablers in achieving these goals.

In an Oct. 18, 2015, Defense News article, Maj. Gen. Mark McDonald, commanding general of Army Security Assistance Command, was quoted as saying that the Army's security assistance programs totaled more than \$20 billion in sales across 150 countries in FY15. The key to successful exportability of defense items and services is for the government and the defense industry to work together to promote U.S. foreign policy and national security interests effectively. The program executive offices (PEOs) enable the acquisition of weapon systems and technologies in the security assistance process.

The PEO for Ammunition at Picatinny Arsenal, New Jersey, with collaboration from industry, developed a collaborative process to assess exportability of 155 mm artillery weapon systems.

### PRESALE ENGAGEMENT

Depending on the country's interest and the defense item, security assistance programs may be initiated through foreign military sales or direct commercial sales. The technology security and foreign disclosure processes of the Army security assistance enterprise provide guidance and decision on technology and information transfer. This review process determines whether a sale advances U.S. political-military objectives by building the capacities of allies and partners while also maintaining U.S. operational and technological advantages and protecting critical technology from diversion to potential adversaries.

Government and industry can engage prior to receiving a letter of request from a country to explore capabilities that the country may require. A letter of request—spelled out in DOD 5015.38-M, the Security Assistance Management Manual—is what it sounds like: a request from a country to buy a defense item, or for the price and availability of an item.

To ensure compatibility before a sale, a security cooperative development program is an effective means to assess interoperability with allies and coalition partners. The Office of the Deputy Assistant Secretary of the Army for Defense Exports and Cooperation (DASA(DE&C)) uses that method to assess if a U.S. system works on a foreign platform. This enables industry to showcase its product under a government-to-government agreement before a possible sale of a defense article.

### A CASE STUDY IN EXPORTABILITY

The Precision Guidance Kit (PGK) fuze provides a good case to study the exportability of defense items made by the U.S.

*The key to successful exportability of defense items and services is for the government and the defense industry to work together to promote U.S. foreign policy and national security interests effectively.*



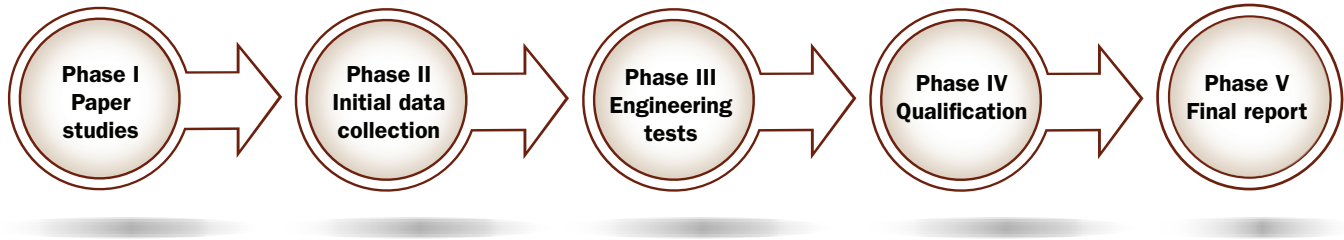
### INTERNATIONAL PARTNERS

A German DM111 projectile equipped with a PGK fuze stands before a German PzH 2000 self-propelled howitzer in September 2014 at Yuma Proving Ground, Arizona.



FIGURE 1

## SMART MUNITION QUALIFICATION PROCESS FOR FOREIGN SYSTEMS



### STEP BY STEP

PM CAS developed a five-step qualification process to make sure that U.S. defense items work properly with those of foreign partner nations. The process can be adapted by any PEO to its own potential sales. (SOURCE: PM CAS)

industrial base. The PGK is a premier, low-cost device that uses GPS technology and can turn conventional 155 mm artillery munitions into near-precision munitions, reducing collateral damage and the logistics burden for the warfighter. As such, it's attractive to foreign buyers. The product manager for guided precision munitions and mortar systems (PM GPM2S), under PEO Ammunition's project manager for combat ammunition systems (PM CAS), manages the PGK. Orbital ATK Inc. of Dulles, Virginia, is the prime contractor.

As PGK continues into full-rate production, partner nations have shown great interest in evaluating this capability to ensure that the product meets their requirements for performance and safety standards. However, a disciplined process for evaluating the potential use of PGK in foreign systems had to be developed, including working with the foreign partner at each step so it could make informed decisions.

PM CAS has developed a five-step process that can be tailored by any PEO with programs that need to integrate with a foreign platform. The PM CAS program assesses commonality and interoperability before qualifying PM CAS precision products on a foreign weapon or platform.

For partner nations that have a signed memorandum of understanding (MOU) and associated agreements with the U.S. government, a project arrangement (PA) can be developed

with the partner nation to assess compatibility. PM CAS project officers engage closely with DASA(DE&C) and U.S. Army Security Assistance Command (USASAC) to gain approval to start exploratory discussions with a partner nation to develop a framework for a collaborative PA. The PA is jointly managed, and the costs and benefits are shared equitably based on an existing MOU between governments. A successful PA benefits both nations in understanding risks before developing a letter of request.

### HOW THE APPROVAL PROCESS WORKS

As PGK is qualified on U.S. government 39-caliber 155 mm platforms and ammunition, PAs provide the framework necessary to assess standardization and interoperability with foreign 155 mm ammunition and 52-caliber weapon platforms. Project officers work closely with partner nations to conduct exploratory discussions to draft a PA that defines the overall objectives, scope of work, schedule and sharing of tasks.

Project officers develop the PA documents, and then DASA(DE&C) officers and negotiators process the PA through the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology, partner nation negotiators and the Office of the Secretary of Defense for approval to sign the PA.

Once both governments have signed the PA, project officers coordinate with partner nations to execute it.



#### LIVE FIRE

A German PzH 2000 self-propelled howitzer successfully fires a DM111 projectile with a PGK fuze in October 2015 at Grafenwoehr.

#### FIVE STEPS TO QUALIFICATION

The five-step process for smart munition qualification for foreign systems can be implemented under a foreign military sales case or an armaments cooperation agreement between governments. This example demonstrates how that process unfolded with PGK. (See Figure 1, Page 33.) The United States and Germany conducted a successful PA to evaluate compatibility between the PGK and the German DM111 projectile and the Panzerhaubitze (PzH) 2000. PM CAS, with support from the U.S. Army Armament Research, Development and Engineering Center (ARDEC), Orbital ATK Inc. and Germany, led the effort to conduct technical analysis and jointly develop a test plan to evaluate compatibility and demonstrate performance of the PGK.

1. The first phase begins with a paper study to evaluate suitability and compatibility. ARDEC supports PM CAS by conducting aeroballistics analysis, modeling and simulation, and candidate weapon drawing analysis to understand variations with qualified U.S. systems and confirm survivability and suitability of PGK on foreign systems. ARDEC builds sophisticated models to evaluate PGK performance in foreign weapon systems using foreign ammunition.
2. The next phase requires that the United States and the partner nation jointly develop a test plan to collect interior and exterior ballistic data on foreign ammunition and weapon platforms. In this case, U.S. and German project officers developed a plan to conduct initial data collection tests. The project officers then conducted tests at Meppen Proving Ground, Germany, to collect initial data to establish the reference trajectory and survivability of PGK with German DM111 projectiles fired from the PzH 2000. A successful demonstration led to additional live fire testing at Yuma Proving Ground, Arizona, to collect interior and exterior ballistics data.
3. The third phase requires the United States and the partner nation to jointly develop a test plan to conduct engineering tests to verify guidance algorithms and fire control interface. Engineering tests were successfully conducted at Yuma in September 2014; German DM111 projectiles fitted with the PGK fuze were fired from the PzH 2000 at a target 27 km from the gun.
4. Next, the United States and the partner nation conduct safety and performance qualification acceptance testing on foreign ammunition and weapon platforms. While this phase has not been completed, in October 2015, for the first time, a PGK/DM111 projectile was successfully fired from the PzH 2000 at Grafenwoehr, Germany, with support from the Joint Multinational Training Command. PM CAS and Germany had visitors from the Netherlands, Poland and Norway observe the firing and allowed Orbital ATK Inc.



## FOREIGN INTEREST

Officials from the United States, Germany, the Netherlands, Poland and Norway gather to observe a live-fire demonstration in October 2015 at Grafenwoehr. In Phase IV of the smart munition qualification process, live fire demonstrations verify guidance algorithms and fire control interface between the PGK and foreign systems.

to market PGK to the NATO countries. This joint cooperation has led to successful demonstration, which will validate its robustness and interoperability and could serve as a solution to the partner nation's correction fuze requirement for 155 mm artillery.

5. Finally, all the test data will be compiled for final analysis and the results provided for acceptance by the partner nation.

## CONCLUSION

Such cooperation in a PA provides the means for partner countries to reduce technical risks and assess exportability of U.S. defense articles and services in a competitive foreign market. For industry to have an opportunity to market its product in a live-fire environment with the appropriate country representatives is a huge benefit. It will help the country's decision-makers to observe the defense product's performance and then work toward submitting an official request to purchase the product and services.

The PGK fuze delivers a decisive and preminent capability on today's battlefield

where collateral damage is unacceptable. PM CAS continues to collaborate with partner nations with approval from DASA(DE&C) and USASAC to evaluate PGK's compatibility, performance, operational safety and suitability with foreign 155 mm munitions and artillery systems to advance foreign military sales with partner nations.

Exporting PGK by working with industry and the various stakeholders within the U.S. government will enable coalition partners to gain a precision tool that will strengthen partnership and continue cooperation for weapon and platform compatibility.

*For more information on the Security Assistance Management Manual and the policy memorandums issued by the Defense Security Cooperation Agency, go to <http://www.samm.dsca.mil/>.*

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***PM CAS has developed a five-step process that can be tailored by any PEO with programs that need to integrate with a foreign platform.***



A large, white, parabolic satellite dish dominates the frame, its surface composed of many small, rectangular panels. Several white structural ribs radiate from the center to the edge. In the center of the dish, a white cylindrical antenna is being installed. Three technicians are visible: one is perched high on a rib near the top of the dish, another is on the ground near the base of the antenna, and a third is on the ground wearing a red hard hat. The background is a clear blue sky.

### PROJECTS BIG AND SMALL

Technicians install a satellite antenna as part of the Modernization of Enterprise Terminals effort. While the large, fixed satellite dishes are the most visible project of the product lead for Wideband Enterprise Satellite Systems, it also acquires and fields many smaller systems central to the success of Army and DOD partners' satellite communications networks. (Photo by Shiho Fujii, Project Management Office for Defense Communications and Army Transmission Systems)



# MAKING ACQUISITION RAPID: *A Practitioner's View*

Acquisition is a slow process by nature; always has been, always will be. Or is it? Could the remedy be as simple as getting out of our own way? In Walt Kelly's words: 'We have met the enemy and he is us.'

*by Lt. Col. Joel D. Babbitt*

In the world of acquisition and project management, cost, schedule and performance are king. Actually delivering a product that meets the needs—performance—in the agreed-upon time-frame—schedule—and with the resources you've been given—cost—is harder than it sounds and is doubly so within DOD. The challenges are formidable:

- A requirements process that takes two to four years.
- A money forecasting process that takes two to seven years.
- A milestone approval process that takes three to six months of staffing at each checkpoint.

Add to the above list of challenges the customer expectation so clearly expressed by one of my former customers: "I want it now. If I wanted it in three years, I'd ask for it in three years."

We've all heard of rapid acquisition offices, such as the Rapid Equipping Force, or organizations within United States Special Operations Command (USSOCOM), but the vast majority of us serve in acquisition organizations that do not have special rules, special authorities or any way of accelerating what is otherwise a very onerous system. So, how does a practitioner actually make acquisition rapid? It starts with a proactive, take-appropriate-risks, get-it-done mindset. So, if you have that mindset, here are several examples of how acquisition can be made rapid to help you frame your acquisitions for speed.

## **LESSON 1: GO SMALL, WIN BIG**

To increase their effectiveness, special operations forces (SOF) wanted the same communications capability on Air Force C-17 aircraft while flying to an overseas objective that they had back in their joint operations centers or command posts. Rather than develop a solution from

scratch, SOF acquisition adopted the existing Southwest Airlines Row 44 Ku-band internet solution with slight modifications to ensure connection to the necessary networks. Later, Warfighter Information Network – Tactical Increment 1 adopted this solution for an initial operational capability (IOC) in the Army, calling it the Enroute Mission Command Capability (EMC2), while simultaneously taking the next step and adding Ka-band to the antenna for the full operational capability (FOC).

These small steps allowed the effort to build momentum and provide immediate capability to the Soldier while developing the future capability. Each of these phases (SOF capability, Army IOC capability and Army FOC capability) was two to three years long. DOD names as a primary goal of Better Buying Power (BBP) 3.0 incentivizing greater and timelier innovation by removing barriers to the use of commercial technology. Leveraging commercial technology can make big efforts small and small efforts fast.

The lesson learned? Leverage other people's developments and make your efforts small to win big.

### LESSON 2: SLOW IS SMOOTH, SMOOTH IS FAST (SNIPER MAXIM)

When USSOCOM initially approached the Air Force program office, the time estimate for the C-17 antenna installations was six years—a lifetime to special operations. To reduce that timeline, USSOCOM framed the effort. Instead of immediately chartering a project and standing up an integrated project team, USSOCOM went back to basics, launching a series of studies.

The first was a network study to figure out which military or commercial airborne satellite network should be leveraged, followed by an antenna placement study to determine where on the aircraft the antenna should be located to minimize technical risk and, therefore, cost. The approach was most aptly summed up by the deputy J-6: We were “going slow to go fast.”

Doing two studies allowed for better framing decisions to be made, which reduced the risk to the antenna and aircraft contractors and the government at the same time. A prototype further reduced risk, followed by a kit-proof, or operational prototype effort, before the full production run.

All this time, we managed the two contractors (antenna and aircraft providers), rather than putting one in charge of the other. By production time, all the risk was wrung out of the effort, which reduced costs by more than half between development and



### AIRBORNE SITUATIONAL AWARENESS

A Global Response Force paratrooper uses the Army's EMC2 for in-flight situational awareness while flying from Fort Bragg, North Carolina, to Nellis Air Force Base, Nevada, in December 2015. The EMC2, or “flying command post,” improves situational awareness, command and control for airborne elements. (U.S. Army photo by Capt. Lisa Beum, 1st Brigade Combat Team, 82nd Airborne Division (1-82 ABN) Public Affairs).

production. Overall, the original six-year and \$50 million-plus working estimate for a “give it to a prime integrator” approach was reduced to three years and just under \$25 million. Effectively, both the budget and schedule were cut in half.

The lessons learned? Take the time to do the brain work up front, be innovative in your approach, control the process and keep the system-level integration in-house if possible.

### LESSON 3: START SMALL, BUILD ON SUCCESS

For the Army's Transportable Tactical Command Communications program, which provides small satellite dishes to teams through company-sized Army units, the program office leveraged a developmental effort from USSOCOM—the X-Band MicroSat Project (XBMS). The XBMS project produced the first high-bandwidth, sub-one-meter X-band satellite dishes through a three-part developmental effort: a proof of concept through the Air Force Research Laboratory, followed by an open competition for prototypes and a production competition for those who submitted prototypes. The total cost of development was less than \$1 million and took about a year and a half. That three-step process resulted in the full fielding of these terminals throughout subordinate units at a little over the original targeted price of \$50,000 per terminal.



*Tackling big problems by taking them in multiple steps provides time to deal with challenges that arise. By stitching together multiple smaller, discrete efforts into a larger effort, victories add up over time.*

The lessons learned? Decompose large efforts into small efforts, start with a government lab rough prototype to show what's possible, have cost targets that vendors must meet to stay competitive and foster robust competition.

#### LESSON 4: SMALL PIECES SOLVE BIG PUZZLES

The Program Executive Office (PEO) for Enterprise Information Systems, Wideband Enterprise Satellite Systems (WESS) program office is essentially the Army's satellite gateway program—a place tuned to constant, incremental change to meet customer needs. WESS fields and upgrades the Army's 18 enterprise gateways (formerly called STEP sites). Other than the Modernization of Enterprise Terminals mission, a program that fields 12.2-meter satellite dishes around the world, WESS's efforts comprise small, incremental upgrades to existing products or technology refresh

of legacy functions. The umbrella of a large program allows for running many smaller programs start to finish under it, ensuring the freedom to create and field new capabilities such as precision timing racks, modem upgrades and next-generation satellite control software, to meet the gateways' needs by keeping oversight at the PEO level and avoiding what would be an unnecessary acquisition category oversight structure.

This freedom has led to innovative technical solutions that are being fielded not only to Army gateways, but by the Defense Information Systems Agency, the Air Force and others. We follow the DOD BBP 3.0 guidance to “eliminate unproductive processes, and bureaucracy.” BBP 3.0 advocates reduction of reviews and unproductive processes, and admonishes PEOs and project managers to “exercise full responsibility and authority commensurate with their position.”

#### TAKING A PAGE FROM SOF

The EMC2, shown here in use by a Global Response Force paratrooper before a parachute assault at the Army/Air Force Joint Forcible Entry exercise in December 2015, originated an SOF solution. Later, it became part of WIN-T Inc 1 as an IOC. The Army added Ka-band to the antenna for the FOC. (U.S. Army photo by Capt. Lisa Beum, 1-82 ABN Public Affairs)



The lessons learned? Leverage existing programs to minimize oversight requirements, foster innovation within your program, give others the answers to your common problems and you all win together; keep it simple and don't add unnecessary structure.

In each of the above cases, keeping the effort as small as possible was one of the keys to success. There are several reasons why keeping efforts small has positive effects, such as:

- Funding a large effort is a monumental task. It takes a lot of political capital, program objective memorandum planning and a lengthy requirements process to make a large effort happen. However, in most cases, the same result can be achieved over time by making each phase or spiral a smaller, discrete effort.
- Funding a small effort is much easier than funding a large effort. Within DOD, we have numerous rules for how much money can be realigned. The more money that must be realigned, the higher the approval must go and the longer it takes. Over time, funding a number of sequential efforts is much easier and allows for a quicker start than trying to fund one large effort.
- If things do not go as planned, or if expected results do not materialize, then a small effort is politically much easier to end than a large effort.
- Tackling big problems by taking them in multiple steps provides time to deal with challenges that arise. By stitching together multiple smaller, discrete efforts into a larger effort, victories add up over time. This provides time to work on the efforts that lag while keeping credibility intact.



- Starting small also attracts innovative small corporations to the effort, rather than large defense contractors with their high overhead costs and bureaucracy. BBP 3.0 advocates increasing small business participation to promote effective competition because it works. Corporate partners do not expect big payoffs from small efforts, so fees and overhead are typically smaller.
- Smaller efforts keep testing requirements right-sized and typically do not attract disproportionate oversight from the test community.
- Smaller efforts are less likely to experience serious bloat and become a target in the constant budget wars. Examples of programs that became too big, attracted too much attention and were then canceled are legion in the Army, such as Future Combat Systems, Comanche and Crusader, to name just a few. In a time when mammoth hunting is a fashionable sport, it is easier to not be a mammoth.

- With a limited fielding, once an effort is successful, other potential customers will clamor for the solution, which will drive up the basis of issue. The product will grow naturally, instead of imploding under excessive expectations.

## CONCLUSION

Acquisition does not have to be large, slow and ponderous. However, making it small, fast and agile is a conscious decision that must be made up front in the framing of a program. Do not be afraid to stay small and agile and to take responsibility for making your system a success. Your customers—our Soldiers—will appreciate the results.

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## SIMPLER SOLUTION

Soldiers from the 82nd ABN erect a Terrestrial Transmission Line Of Sight (TRILOS) radio during an expeditionary network demonstration in March 2015 at Fort Bragg, North Carolina. TRILOS provides 12 times the bandwidth of the legacy capability in a smaller package. It is easy to set up, and advanced signal Soldiers are not needed to operate the system. (Photo by Amy Walker, Program Executive Office for Command, Control and Communications – Tactical Public Affairs)

# CALIBRATING COLLABORATION WITH INDUSTRY

Tasked with delivering ammunition for weapons ranging from handguns to tanks, PM MAS customizes strategies and partnerships with the private sector to develop the best solutions for the warfighter.

*by Col. Moises M. Gutierrez,  
Lt. Col. John Todd Masternak,  
Mr. Christopher R. Seacord  
and Lt. Col. Kyle A. McFarland*



## FUELING THE FIRES

A tank crew from the 1st Armored Brigade Combat Team, 1st Cavalry Division (1/1 CD) fires the 120 mm main gun of an M1A2 Abrams main battle tank at a target in December 2015 at the Sugar Loaf Multi-Use Range at Fort Hood, Texas, during training before deploying to the Republic of Korea. The industrial base for tank ammunition requires particularly close cooperation with the Army. (U.S. Army photo by Sgt. Christopher Dennis, 1/1 CD Public Affairs)

From the handgun ammo supplier who straddles the commercial demand-driven market to the unique, military-only tank ammunition supplier who must rely on foreign military sales to retain market competitiveness, each segment of the DOD direct fire ammunition portfolio demands different, multiprong, process-driven strategies to gain the best value and profit while maintaining product overmatch.

The project manager for maneuver ammunition systems (PM MAS) develops all Army direct fire munitions and manages DOD direct fire procurements with government-to-industry partnerships. As one of the project managers within the Program Executive Office for Ammunition, which executes the role of single manager for conventional ammunition, PM MAS leverages multiple strategies, processes and key partnerships for each of the family of products.

## SMALL-CALIBER DIVIDENDS

Cooperation between the Army's ammunition enterprise and Orbital ATK Inc. continues to pay dividends three years into the operating contract for the Lake City Army Ammunition Plant (LCAAP) in Missouri. An April – June 2013 Army AL&T magazine article titled "Competition Case Study" discussed the government-encouraged investment in LCAAP, the Army's premier small-caliber ammunition manufacturing facility, through a competitive acquisition strategy. Bidders responding



## Small-Caliber Ammunition Family



### MAKING SMALL SAFER

Small-caliber ammunition encompasses 5.56 mm, 7.62 mm and .50-caliber rounds, and includes cartridges for combat (ball, tracer, armor-piercing and incendiary) and training (blank, short-range training, marking and dummy). Because there's a commercial market for small-caliber ammunition, the industry is less vulnerable to swings in DOD demand, so the Army and Orbital ATK, a contractor that runs the government-owned LCAAP, have been able to focus on improving ammunition quality and improving safety at the plant. (U.S. Army photo)

to the request for proposals had an incentive to propose investment plans in exchange for commercial use authorization. A win-win situation for the Army and the operating contractor resulted in reduced costs, improved production efficiencies, a continuous workforce and less downtime for equipment. This innovative strategy required documenting governance controls and clearly defined procedures up front.

Orbital ATK's capital investment in LCAAP has resulted in improvements to many areas of the plant: design and implementation of advanced material handling and control; design and implementation of process control technology; replacement of water traps on test ranges; implementation of safer primer delivery containers; and modernization of packaging equipment and processes. The investments have resulted in more efficient and sustainable production; delivery of higher-quality small-caliber ammunition; and a better and safer workforce environment.

Army and Orbital ATK leadership are generally in agreement on the future vision for LCAAP. However, the team diverges at times on plant priorities and project scopes. To work through these differences, the government adopted Orbital ATK's proposed establishment of an investment board consisting of two members from the Army ammunition enterprise and two members from Orbital ATK's program management leadership. At

its monthly meetings, the board provides joint oversight and coordination at the appropriate level to make sound and timely decisions. This partnership enables the team to resolve conflicts while continuing to move plant improvements forward.

Although Army and Orbital ATK leadership agree this structure improves execution of the investment plan, both would recommend establishing and documenting clear governance controls and procedures earlier in contract execution to allow leadership to focus more on developing the vision and making good investment decisions.

### MEDIUM-CALIBER PARTNERSHIPS

The product director for medium-caliber ammunition (PD MC) strategically focuses on two areas in its partnership with industry: industrial base preservation and development collaboration.

While it may seem counterintuitive that an industrial base could be at risk despite our continued conflicts, the reality is that the medium-caliber sector production quantities have been in decline since 2009. The decline was the result of reaching healthy training and combat stockpiles with a simultaneous reduction in the requirement.

The decline has had a significant effect on the industrial base, leading to consolidation at the supplier and sub-tier supplier levels. In order to preserve the medium-caliber industrial base, the product office developed a plan to combine calibers across services and limit the playing field to our known suppliers to save key production capabilities at the supplier and sub-tier supplier levels, with the goal of ensuring long-term viability.

The plan, created in partnership with industry, was put into action in 2009 and is known as the Medium-Caliber Family Acquisition (MCFA). The intent was to right-size production lines, preserve dual-source suppliers for key capabilities and lower costs. The first contract awarded under this plan was implemented in 2013. Since its initiation, the MCFA has met, and in some cases exceeded, its goals by maintaining dual-source viability for key production capabilities, lowering unit costs while reducing quantities and ultimately delivering the highest-quality munitions to the warfighter.

The second area in which PD MC engages our industry partners in a novel way is through the development of new munition solutions to meet identified gaps in warfighter capabilities. As the capability gaps are discussed, we engage our in-house research, development, test and evaluation (RDT&E) asset, the

U.S. Army Armament Research, Development and Engineering Center (ARDEC), and our industry partners through industry days spanning our entire portfolio and engagements of more targeted scope (National Defense Industrial Association conferences, market surveys, project industry days, etc.) to get each organization to spend its limited RDT&E funds on the technical solutions that can meet these gaps. We motivate them to invest by showing them the Army's path forward—specifically, the capability gaps we are trying to address for the warfighter.

This targeted development helps refine and advise the requirement as it's being developed and staffed, ensuring that the solution is feasible. It also can accelerate the acquisition development phase, shortening the time from concept to fielding.

Our primary vehicle to share and partner in the development of new solutions is the cooperative research and development agreement (CRADA). Under a CRADA, government and industry can share ideas and test theories that minimize program risk for each party and ensure the best solution. This approach was initiated several years ago, and we believe it will deliver timely solutions to meet urgent warfighter needs.

## LARGE-CALIBER ALTERNATIVES

The product manager for large-caliber ammunition (Product Manager LC) continuously works with industry to maintain critical capabilities and opportunities for competition. Firing projectiles from cannons at high speed is a unique function. As such, there is little to no demand in the commercial marketplace for certain components and materials used in large-caliber ammunition. Product Manager LC works with suppliers to ensure that budgets and requirements stay at levels appropriate both for Army requirements and industry sustainability. While maintaining this balance, Product Manager LC also has worked to sustain two qualified system-integrating contractors. This facilitates competition, which drives more innovation in developmental programs and lowers costs in production.

Armor-piercing tank cartridges are one of the last military uses for depleted uranium. No other material has demonstrated the same lethality against hard targets, which makes it a critical component for Product Manager LC. However, working with depleted uranium requires special licensing and handling procedures. While some commercial applications exist, the commercial workload alone will not sustain a full-time depleted uranium supplier. Realizing this, Product Manager LC began working with Aerojet Ordnance Tennessee Inc. in 2012 to reduce its manufacturing footprint by approximately 46,000

## Medium-Caliber Ammunition Family



### VICTIM OF ITS OWN SUCCESS

The medium-caliber ammunition family, used with medium handheld and crew-served weapons, includes armor-piercing, high-explosive, smoke, illumination, training and anti-personnel cartridges to defeat light-armored targets. The medium-caliber ammunition industry was to some extent a victim of its own success: The Army was able to produce enough ammunition for active use and develop a healthy stockpile quickly enough that production has declined steadily since 2009. To preserve the industrial base, PD MC combined orders with those from other services and stuck with known suppliers. (U.S. Army photo)

## Large-Caliber Ammunition Family



### BIG CALIBER, BIG CHALLENGES

The family of large-caliber ammunition for tanks faces two challenges: First, there's almost no commercial market for it, so suppliers are wholly dependent on DOD sales. Second, large-caliber armor-piercing ammunition is one of the last uses for depleted uranium, so suppliers need special licenses and again depend heavily on DOD sales. PM MAS helped one supplier reorganize its manufacturing space to cut overhead and operating costs so the supplier is less vulnerable to decreased demand. (U.S. Army photo)

square feet, while maintaining sufficient capacity to meet government requirements. The effort led to a \$1.5 million reduction in annual operating costs and decontaminated unneeded facilities for return to other uses. Product Manager LC is continuing to work with Aerojet and Orbital ATK to ensure that production continues with minimal gaps to maintain the capabilities essential to national defense.

Combustible cartridge cases are also a unique application for ammunition. The cases are important since they reduce volume of expended material after firing, and space is at a high premium inside a tank. A case that burns completely in under the tenth of a second it takes to fire a tank round is similar to cardboard, yet it must support projectiles weighing over 40 pounds, in some cases.

Balancing these requirements is a niche skill that Esterline Defense Technologies has performed well for several decades. However, the Army currently requires a fraction of the tank rounds it did 10 or 20 years ago. That has put a strain on Esterline to maintain this needed capability at economical rates. To help sustainment, Product Manager LC worked with Esterline and product offices under the project manager for combat ammunition systems, which rely on related products, to ensure that sufficient business exists. Product Manager LC also works with HQDA G-4 and G-8 to plan future year procurement to avoid large swings in quantities from year to year, which would make it difficult for Esterline to continue efficient operation.

Despite the drastically reduced quantities in tank ammunition requirements, Product Manager LC continues to work with two prime system contractors: Orbital ATK and General Dynamics Ordnance and Tactical Systems. While either contractor likely has the capacity to produce all of the Army's requirements in the current environment, maintaining multiple sources offers several benefits. It provides ample surge capacity to the national industrial base, which reduces risk for future contingencies. It also develops secondary sources of supply at component levels, which reduces the overall risks to the product office as a whole. Perhaps most importantly, it sustains competition for development of new ammunition. Maintaining two prime contractors has facilitated competitive prototyping into the engineering and manufacturing development phase for the last two large-caliber programs of record.

This approach, while marginally increasing administrative requirements for the government, greatly reduces cost and performance risk for development programs. It allows for more innovation going



### SHARING THE BENEFITS

LCAAP, with this newly automated 7.62 mm and .50-caliber ammunition can printer, has benefited from a public-private cooperative agreement whereby the government owns the plant and Orbital ATK Inc. operates it and uses the plant to make ammunition for the commercial market. Orbital ATK's investment in equipment upgrades also supports LCAAP's continued operation as the Army's main source for small-caliber ammunition. (Photo by Orbital ATK Inc.)



### ENGAGING TARGETS—AND INDUSTRY PARTNERS

Pfc. Francisco Rodriguez, an M240B machine gunner with the 24th Infantry Regiment, engages targets at an M4 range at Fort Wainwright, Alaska, in March. Honing the competitive edge across the Army's diverse ammunition portfolio of products, suppliers and users requires an innovative approach that brings industry in on the ground floor. (Photo by Sgt. Corey Confer, 1st Stryker Brigade Combat Team, 25th Infantry Division Public Affairs)





### MP LOADS UP

A U.S. Army Reserve military police Soldier holds two belts of 7.62 mm rounds for an M240B machine gun qualification range at Camp Atterbury, Indiana, during a three-day training event in November 2015. As the manager for all DOD procurements of direct fire ammunition, PM MAS has learned that there's no one form of military-industry cooperation that works best—each family of ammunition needs to be approached individually. (U.S. Army photo by Master Sgt. Michel Sauret, 200th Military Police Command)



### GUNNING IT

The gunner of an AH-64D Apache helicopter assigned to the 3rd Combat Aviation Brigade (CAB) fires the 30 mm cannon at the Multi-Purpose Range Complex on Fort Stewart, Georgia, in January. For the medium-caliber family, like the 30 mm fired from the M230 chain gun shown here, DOD takes part in a CRADA with industry whereby new ideas can be floated, tested and developed jointly. (Photo by Spc. Scott Lindblom, 3rd CAB Public Affairs)

into development, increases the chances of identifying a feasible solution and puts competitive pressure on the contractor's pricing.

### CONCLUSION

Preserving the competitive edge for tactical direct fire capability requires multiple, unique relationships with our industrial partners. These partnerships require the unified visions of industry and the government based on give-and-take. Although profit is a significant consideration, it is the joint long-term visions that are unique in function, with industry partners offering capabilities that demand sustainment.

We have taken on the challenge of sustaining those capabilities while increasing performance for the Soldier. Doing so requires routine engagement with industry to adjust to changing environments that meet the government's requirements while respecting industry's economic viability.

For more information, go to <http://www.pica.army.mil/peoammol>, or contact the authors at [moises.m.gutierrez.mil@mail.mil](mailto:moises.m.gutierrez.mil@mail.mil); [john.t.masternak.mil@mail.mil](mailto:john.t.masternak.mil@mail.mil); [christopher.r.seacord.civ@mail.mil](mailto:christopher.r.seacord.civ@mail.mil); or [kyle.a.mcfarland.mil@mail.mil](mailto:kyle.a.mcfarland.mil@mail.mil).

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*Defense Acquisition University. He is Level III certified in program management.*

*LT. COL. JOHN TODD MASTERNAK is PEO Ammunition's product manager for small-caliber ammunition. He holds an M.S. in systems engineering from the Stevens Institute of Technology and a B.S. in industrial and systems engineering from Ohio State University. He has served in the Army as an Ordnance Corps and Acquisition Corps officer for more than 20 years. He is Level III certified in program management, and is a member of the Army Acquisition Corps (AAC).*

*MR. CHRISTOPHER R. SEACORD is PEO Ammunition's PD MC. He holds an M.S. in information management from Marymount University in Virginia and a B.S. in computer and information systems engineering from the University of Florida. He has served in the Army as an engineer officer and Acquisition Corps officer for 23 years, and after retirement from active service continues to serve in the Acquisition Corps as a DA civilian. He is Level III certified in program management and science and technology management and Level I in information technology. He is a member of the AAC.*

*LT. COL. KYLE A. McFARLAND is the Product Manager LC for PEO Ammunition. He holds an M.S.E. in mechanical engineering from the University of Texas at Austin and a B.S. in mechanical engineering from the United States Military Academy at West Point. He has served in the Army as a field artillery and Acquisition Corps officer for more than 17 years. He is Level III certified in program management and Level I certified in contracting, and is a member of the AAC.*



# FACES *of the* FORCE

## MR. VICTOR HERNANDEZ

### MR. VICTOR HERNANDEZ

#### COMMAND/ORGANIZATION:

Program Management Directorate,  
Program Executive Office for Enter-  
prise Information Systems

#### TITLE:

Director of program management

**YEARS OF SERVICE IN WORKFORCE:** 19  
(13 years as a civilian)

**YEARS OF MILITARY SERVICE:** 11

#### DAWIA CERTIFICATIONS:

Level III in program management and  
Level III in business-financial manage-  
ment; Certified Defense Financial  
Manager

#### EDUCATION:

MBA, Virginia Tech; M.S. in finance  
and B.S. in business management,  
National Louis University

### Need for speed

“**W**e have to get faster.” So said Victor Hernandez, director of program management for the Program Executive Office for Enterprise Information Systems (PEO EIS). “Our acquisition, requirements and oversight responsibilities often put us in the position where we’re chasing new technology. If I could change one thing about the acquisition process, it would be to speed it up so that we can get critical capabilities to our warfighters quicker.”

Hernandez’s experiences have left him well-equipped for his current role. He spent 11 years in the Army (six of those in the acquisition workforce), working first in finance and then in the Signal Corps. “As a signal officer, I worked with all kinds of communications—satellites, computers, networks—and being able to combine that with my finance background is perfect for the work we do in EIS.”

He has been in acquisition as a civilian since 2003, and he noted that mentoring is a big part of his job. “I really enjoy mentoring, but some may think of me more as a tormentor. A critical component of mentoring is being honest, and sometimes that includes having difficult conversations. When people ask me for advice, sometimes that’s not really what they’re looking for. Sometimes they’re actually asking, ‘Here is where I want to go—can you give me a guide to get me there?’ And sometimes the feedback is not the glowing recommendation that they were expecting, and that can be hard to hear. But being a mentor—a sincere mentor who is invested in a person’s success—has to be based on honesty,” he explained. “Without honest feedback, people don’t know where they need to make changes to improve—otherwise, they would have done it already.”

**What do you do in your position, and why is it important to the Army or the warfighter?**

I am the director of program management for PEO EIS. The Program Management Directorate covers a lot of ground: We provide oversight and management for acquisition and business processes for more than 35 program offices. This includes managing the budget process for a portfolio of more than \$18 billion across the program objective memorandum period, and supporting the manpower, congressional and public affairs and audit missions across the PEO. Our work may seem slightly removed from the warfighter, but we work every day to ensure that the acquisition process remains on track, that funding and people are in the right place at the right time and that we are communicating our goals and efforts effectively. All of this directly contributes to ensuring that Soldiers receive the information technology solutions that we have promised and keeps the global Army connected.

**How did you become part of the Army Acquisition Workforce, and why?**

When I took off the uniform, I went to work for the U.S. Army Materiel Command, supporting the finance mission. After a few years, I decided that I really wanted to be part of Army acquisition, because the finance mission here is so different than anywhere else. In acquisition, you have the opportunity to have an impact directly on the Soldier. Results of decisions are immediate, and you are in a position to try to fix processes that aren't working. By joining the Army Acquisition Corps, I knew I could help get Soldiers what they needed. As we in PEO EIS like to say, I'm truly in a position to support every Soldier, every day, everywhere.

**What do you see as the most important points in your career with the Army Acquisition Workforce, and why?**

For me, the most important points in my career have been the "silent wins"—the things that I have done for people and for programs that have made them successful, but that not everyone hears about—successfully finding funding solutions for programs through some really tough times, including a government shutdown, sequestration and multiple continuing resolutions, and helping them stay on track to meet their schedules and get capabilities out to the field. I think these are so critical because they have helped our PEO EIS team to be successful for the Soldier in the field.

**Can you name a particular mentor or mentors who helped you in your career? How did they help you? Have you been a mentor?**

Jim Daniel, who retired as a colonel from the Air Force, became a mentor early in my Army career and is someone I'm still in touch with. He was a tremendous leader and treated everyone with respect. At a time in my life when it seemed rank was the only thing that mattered, he made a point to value every person's contribution. He accepted different opinions and valued perspectives other than his own. When he told us to do something, he took the time to explain why it was important. Whether you agreed with it or not, you understood why. He truly encouraged me to be better in everything, and I work hard to lead by his example and mentor those around me.

**What's the greatest satisfaction you have in being a part of the Army Acquisition Workforce?**

Going back to my earlier comment about silent wins—that is the greatest satisfaction: to help our programs support the Soldier, no matter how long it takes. Right up there with that, however, is also seeing people on my team and the people I mentor being successful. When our teams experience success or accomplish goals they have set for themselves, I celebrate right along with them. This is truly a team sport, and when we work together to get capabilities fielded or when someone gets into grad school or gets a promotion, these wins and accomplishments collectively make us stronger and better prepared for the next challenge.

**What advice would you give to someone who aspires to a career like yours?**

Be real. Play to your strengths and not those that you think others expect you to play to. Talent comes in many shapes and sizes and there is more than one path to success, so staying true to who you are and how you do things is so important. You can achieve success, but unless you've done it as you, on terms that you can accept, it won't be comfortable once you get there, and reaching higher will be even harder. Most of your energy will be going to keeping up the appearance that you have built, which is maybe not the authentic you. So, while there is a lot of advice I could dole out—and my team knows I don't usually hold back—focus and being real are at the top of my list.

—MS. SUSAN L. FOLLETT



## RIGHT PLACE, RIGHT TIME, RIGHT TRAINING

Spc. Logan Duty, foreground, combat medic, and Capt. Hyun Yi, physician assistant, both assigned to the 52nd Air Defense Artillery (ADA) Regiment, 35th ADA Brigade, prepare Soldiers with simulated injuries for medical evacuation during a combined base defense exercise in February at South Korea's Suwon Air Base. Having the right medical materiel in the right place at the right time and ensuring that Soldiers are trained to use it properly can mean the difference between life and death. (Photo by Cpl. Yo Seup Kim, Korean Augmentation to the U.S. Army)





# INTEGRATING Army Medicine

USAMMA finds efficiencies in medical materiel procurement, fielding and sustainment to reduce the logistical footprint and optimize readiness with limited resources.

*by Col. David R. Gibson*

**I**n the Army, we often refer to combat and support capabilities as “the tooth” and “the tail.” We are constantly seeking ways to improve the ratio between the war-fighter and support elements, to maximize the amount of combat power we can project while minimizing the logistics tail. Fielding equipment and materiel that minimize the support and sustainment tail while increasing critical space required for early-entry combat operations increases force agility, adaptability and even lethality.

Although we talk about tooth-to-tail to describe the ratio of combat power to support structure, operations in Iraq and Afghanistan have shown us that battlefields are no longer linear. Soldiers are at risk of illness and injury throughout the force, whether their jobs are in combat arms or a support specialty and whether they are far forward or in a base camp.

Army medicine must integrate medical capabilities throughout the force—placing medical capabilities in both medical and nonmedical units and arrayed in a fashion that enables stabilization, forward resuscitation and medical evacuation—all across an integrated continuum of care that spans from point of injury to stateside health care facilities. To make this possible, we must have the right medical materiel on hand, in the right place, fully operational and easily sustainable, and with Soldiers and providers trained to appropriately employ it when required. All of these conditions are critical in the minutes following an injury, and failure to meet any one of these conditions can mean the difference between life and death.



Army medical capabilities can be found throughout the generating and operating force structure, with combat medics standing side by side with warfighters in the tooth, and medical teams integrated throughout the tail with varying degrees of medical capabilities. In fact, Army medics make up the second largest military occupational specialty, outnumbered only by infantry Soldiers. We serve the entire system to ensure we have a ready medical force and a medically ready force. With the entire Army facing a period of constrained funding and dramatic force downsizing, the tooth, the tail and everything in between is being scrutinized to ensure optimal combat capabilities without jeopardizing our ability to sustain or medically protect and project the force.

#### CENTRALIZED MANAGEMENT

To accomplish the mission with limited resources, the U.S. Army Medical Materiel Agency (USAMMA), a subordinate agency of the U.S. Army Medical Research and Materiel Command (USAMRMC), has evolved many of the ways it does business.

One example is the way USAMMA is centrally managing medical materiel, including sensitive potency and dated

(P&D) materiel such as pharmaceuticals. Deploying medical units need to have this materiel on hand immediately to provide their required capability. However, unlike much of the nonmedical materiel that the Army stocks, P&D items cannot be stored indefinitely, nor can many of the items be bought in large enough quantities and shipped at a moment's notice should a contingency arise.

To be ready and able to support global contingency missions worldwide, these types of supplies are maintained in pre-configured packages by unit type so they can be shipped to support deploying units. Although this seems like a costly strategy, centrally managing a collection of this materiel by unit type enables the achievement of a risk-based balanced approach to maintaining rapid deployment capability while offsetting a significant procurement and maintenance requirement for P&D items.

Currently, the Army has 274 echelons-above-brigade (EAB) medical units. If each of these units bought all of its own medical materiel, the Army would need to spend \$126 million in upfront procurement costs. Additionally, if each EAB unit had to sustain (i.e., conduct inventory, restock, replace items) its own

perishable medical stocks, the Army would spend about \$31 million each year.

Instead, USAMMA centrally manages the Unit Deployment Package (UDP) program. Essentially, these UDPs are kits of medical materiel that deploying units can use during the early phase (i.e., up to the first month) of a contingency. However, UDPs do not provide a long-term solution. Additionally, UDPs may not provide all of the Class VIII materiel (i.e., equipment and consumables) that units need. The program is supported by Defense Logistics Agency contingency contracts, which can currently only cover about 53 percent of required materiel and cannot meet early deployment timelines.

#### RECAPITALIZING VS. REPLACING

USAMRMC and USAMMA are evolving not just because of fiscal constraints and growing missions; we are also changing to continually do what is best for the warfighter and the taxpayer. One example is our recapitalization efforts. USAMMA's operations encompass 19 locations worldwide, including three stateside medical maintenance depots: Tobyhanna, Pennsylvania; Hill Air Force Base, Utah; and Tracy, California. Besides testing, calibrating and conducting depot-level maintenance, each location also refurbishes medical equipment and devices so they can go back out to the field for use. Recapitalization can include refurbishing a device so that it is near "zero-time/zero-mile" (i.e., basically like new again). Recapitalization also can include an upgrade process that results in a newly improved model, with full remaining or extended lifespan and enhanced warfighting capability.

In FY15, USAMMA recapitalized more than 2,000 medical equipment items, saving the Army \$13.2 million—the cost

*Whether supporting early-entry operations or while sustaining ongoing missions, every pound and every inch counts. Fielding equipment and materiel that is lighter, smaller or easier to sustain is one key to simplifying and improving support.*





### GOOD TO GO

A Soldier at Hill Air Force Base Medical Maintenance Division refurbishes medical equipment as part of a major recapitalization. USAMMA's efforts to recapitalize instead of replace support a sustainable model of medical supply that recognizes resource constraints while optimizing readiness. (Photo by Ellen Crown, USAMMA Public Affairs)

to replace this medical materiel instead of recapitalizing it. The largest share of those savings—\$10 million—can be attributed to recapitalizing four items: physiological monitors, \$3.5 million; suctions, \$2.8 million; defibrillators, \$2.1 million; and ventilators, \$1.6 million.

To further reduce the footprint left by unnecessary medical materiel, USAMMA also has applied greater precision to fielding efforts. In the past, during times of high operational tempo, such as the height of combat in the Middle East, USAMMA would reset a unit after deployment by fielding complete new sets of equipment (i.e., full medical and dental sets). However, in FY15, USAMMA

started to inventory high-value items, such as expensive medical devices or equipment, and then provide each unit with only the items it needs based on requirements.

The first two units to undergo precision fielding by USAMMA in late FY15 and early FY16 were the 550th Area Support Medical Company and the 274th Forward Surgical Team, both out of Fort Bragg, North Carolina. By getting only what they required and not all new medical materiel, USAMMA saved the Army \$1.82 million for these two units alone. Four more units are slated to be analyzed and then precision-fielded by USAMMA in FY16.

This type of precision fielding exemplifies the USAMMA mindset of fielding only what is needed with an eye toward reducing excess and optimizing readiness, thus supporting a sustainable model of medical supply that recognizes resource constraints.

### LIGHTER IS BETTER

Whether supporting early-entry operations or while sustaining ongoing missions, every pound and every inch counts. Fielding equipment and materiel that is lighter, smaller or easier to sustain is one key to simplifying and improving support.

As the 2015 Army Operating Concept (AOC), “Win in a Complex World,”



#### INTENTS AND PURPOSES

Pfc. Sang-woo Park, training specialist, Headquarters and Headquarters Company, 19th Expeditionary Sustainment Command, helps lay out a new AirBeam shelter during the Assault Command Post setup. Working with the U.S. Army Medical Materiel Development Activity, USAMMA will modernize a large portion of the structures that make up its field medical hospital systems. These new shelters are lighter, faster to set up and have a longer lifespan than the rigid-frame tents they're replacing. (Photo by Pfc. Woo-hyeok Yang, 19th Expeditionary Sustainment Command Public Affairs Office)

indicates, the Army faces amorphous threats with increasingly changing technology. In many ways, the AOC provides a path for innovation.

In FY16, in collaboration with the U.S. Army Medical Materiel Development Activity, USAMMA is planning to spend more than \$20 million to modernize the Army's field hospital soft-walled Tent, Extendable Modular Personnel (TEMPER) with new air-supported TEMPER shelters. Most of the TEMPERs that currently make up the Combat Support Hospital stock have considerably exceeded their lifespan. The original design life was seven years of operational service and 10 years in storage, and most of the legacy TEMPERs are currently at 20-plus years. Additionally, the legacy tents are heavy and cumbersome to erect. The air-supported TEMPERs are 50 percent lighter—saving roughly 1 million pounds across the force—and cut setup time in half, to roughly 30 minutes. Additionally, the new

shelters have a longer lifespan than the older tents, ultimately costing the Army less in maintenance and replacement.

#### CONCLUSION

One of the greatest values in doing things more efficiently is that we can increase readiness by equipping and sustaining more units. In FY16, USAMMA programmed fielding or modernization for 70 units. After leveraging these and other cost savings and efficiencies in FY16, we expect to be able to actually field or modernize a total of 142 units this year—twice as many as expected while expending the same amount.

Additionally, USAMRMC and USAMMA will continue to refine processes through a RAND Corp. study of medical materiel procurement, fielding and sustainment costs. Currently underway, this study will project the costs to maintain materiel, analyzing potential alternative supply options—for





*Soldiers are at risk of illness and injury throughout the force, whether their jobs are in combat arms or a support specialty and whether they are far forward or in a base camp.*

example, centralized management, technology upgrades to meet standards of care, deferred procurement and contingency contracts or agreements. This essential study, expected to yield results in September 2016, will help link materiel requirements to plans, capability assessment and risk. We need to be efficient, but not at the cost of effectiveness.

Every pound counts. Every dollar counts. But the real bottom line is how we optimize support to our Soldiers—ensuring that they have what is needed to fight and win in our complex world. To present our enemies with multiple and simultaneous dilemmas, we need to do all we can to prevent encountering our own.

For more information on USAMRMC, go to <http://mrmc.amedd.army.mil/index.cfm>. And for more information about USAMMA and its operations, visit <http://www.usamma.army.mil/>.

COL. DAVID R. GIBSON is the commander of USAMMA and the medical acquisition consultant to the Army surgeon general. He joined the Army in November



#### CHECKING THE SCALE

A Soldier in the Medical Maintenance Division at Hill Air Force Base calibrates medical equipment. Hill is one of three USAMMA stateside depots that refurbish medical equipment and conducts testing, calibrating and depot-level maintenance. In 2015, USAMMA recapitalized more than 2,000 medical equipment items, saving the Army more than \$13 million. (Photo by Ellen Crown, USAMMA Public Affairs)

1986 as an enlisted infantry Soldier, receiving his active-duty commission in 1991 as a distinguished military graduate of the ROTC program at the University of Central Oklahoma. He holds a master's degree in public administration from Murray State University, an M.S. in real estate and construction management, a master of business administration and finance from the University of Denver and a master's degree in national security and resource strategy from the Eisenhower School – National Defense University. He also holds a B.S. in business from Central Oklahoma. He is a graduate of

the U.S. Army Medical Department Basic and Advanced Courses, the U.S. Army Command and General Staff College, the U.S. Army War College Defense Strategy Course and the Defense System Management College. He is a fellow of the American College of Healthcare Executives and of the Association for Healthcare Resource & Materials Management, and holds the Project Management Professional and Certified Materials & Resource Professional designations. He is Level III certified in program management and Level II certified in life cycle logistics, and is a member of the Defense Acquisition Corps.





# FACES *of the* FORCE

## MR. DAVID A. RANDALL

### MR. DAVID A. RANDALL

#### COMMAND/ORGANIZATION:

Night Vision and Electronic Sensors Directorate (NVESD), U.S. Army Communications-Electronics Research, Development and Engineering Center (CERDEC), U.S. Army Research, Development and Engineering Command

**TITLE:** Associate director for systems engineering

**YEARS OF SERVICE IN WORKFORCE:** 31

#### DAWIA CERTIFICATIONS:

Level III in engineering, program management, and test and evaluation

#### EDUCATION:

M.S. in information management, George Washington University; B.S. in engineering and B.S. in geophysics, Washington and Lee University

#### AWARDS:

Department of the Army Small Business Innovation Research Award, Department of the Army Meritorious Civilian Service Award, CERDEC NVESD Technical Employee of the Year, CERDEC NVESD Manager of the Year

### ‘Greening’ researchers yields better equipment

David Randall has spent more than three decades with the Night Vision and Electronic Sensors Directorate (NVESD) in the U.S. Army Communications-Electronics Research, Development and Engineering Center (CERDEC). But his work is so much more than being a researcher in a lab coat, running tests.

“I think what surprises most people about my job is how much interaction with Soldiers we have on the science and technology (S&T) side of the Army Acquisition Workforce,” Randall said. “To truly understand the technology and how it will work within the Army system is to understand the Soldiers and their tasks. So, to that end, we have specific training that we refer to as a ‘greening’ course.”

The course puts scientists and engineers in the environment where Soldiers have to live and operate, he explained, including marching with equipment, firing weapons, navigating over land and other Soldier activities. Officers and non-commissioned officers assigned to the organization provide input to the engineers as they develop technology. The group also consults with the training

and doctrine organizations responsible for requirements development.

The upshot? “All of this helps us to better understand what Soldiers will do with our technology and how best to design equipment to meet their needs.”

**What do you do in your position, and why is it important to the Army or the warfighter?**

As the associate director for systems engineering, I primarily focus on ensuring that the technologies that CERDEC NVESD develops are mature and engineered for transition to the program executive offices (PEOs). Since CERDEC NVESD’s core competencies cover a large breadth of technologies—including intelligence and surveillance, reconnaissance and targeting, Soldier sensors, and improvised explosive device, mine and minefield detection and defeat—we have working relationships with most of the Army’s PEOs. I also serve as the CERDEC Soldier portfolio lead and am responsible for coordinating all CERDEC technologies and programs that will transition to PEO Soldier, which includes technologies for communication, mission command and power.

## SCIENCE & TECHNOLOGY

Since the Army is relying on more information for planning and tactical decisions, we must have a network and sensors to provide the data to make better decisions. The technologies that we develop are very important for ensuring that the network is robust and that the targeting and intelligence data are reliable and accurate.

### **How did you become part of the Army Acquisition Workforce, and why?**

I worked in the summer hire program for an Army research and development laboratory at Aberdeen Proving Ground, Maryland, while in college and saw the technology that could help our Soldiers perform better. One of my college classmates served in the military and then came to work at CERDEC NVESD. He recommended that this would be a great place to work and help Soldiers. I have been with the CERDEC NVESD for more than 31 years, and I have seen organizations become PEOs from the inception.

### **What do you see as the most important points in your career with the Army Acquisition Workforce, and why?**

I have had many opportunities within the Army Acquisition Workforce, but one in particular stands out. While taking the six-month program manager course at Defense Systems Management College (now part of Defense Acquisition University), I was exposed to training opportunities that included congressional fellowships. The instructor provided me with additional information on one in particular: the National Institute of Standards and Technology's Commerce Science and Technology (ComSci) fellowship. This is a congressionally approved fellowship focused on the S&T aspects of the military industrial complex. I was assigned to Rep. J.C. Watts of Oklahoma and was part of his congressional

staff for the 105th Congress. This fellowship helped me to understand the entire authorization and appropriations process of budgeting for DOD, and it has been very important and useful for my career in support of the workforce, specifically the PEOs.

### **Can you name a particular mentor or mentors who helped you in your career? How did they help you?**

I would like to identify Col. Marty Michlik and Martin Weaver. Col. Michlik was the project manager for the Night Vision Electro-Optics Program, which evolved into the project manager for night vision, reconnaissance, surveillance and target acquisition (PM NV/RSTA); that was during my first assignment as an engineer working in a program management office on a program of record. He supported me in my activities and encouraged me to pursue acquisition workforce training. Martin Weaver served as my first-line supervisor on the NVESD Soldier Sensors Branch, and approved my Level III training in multiple career fields and the ComSci fellowship program. He also paved my way to get my first supervisory position as the Soldier Sensors Branch chief.

### **What's the greatest satisfaction you have in being a part of the Army Acquisition Workforce?**

As I look back over my career, I see two particular contributions to mission success that bring me great satisfaction. Early on, I worked on the first eyesafe laser rangefinder to be fielded in the Army. Before this system, there were only one or two places in the world where Soldiers could train with a laser rangefinder. After we developed and fielded the Mini-Eyesafe Laser Infrared Observation Set, Soldiers could train at any Army training installation worldwide with the same

equipment they would deploy with. This improved the readiness level considerably for the Army. It was so significant that Col. Michlik received the first PM of the Year Award in 1991.

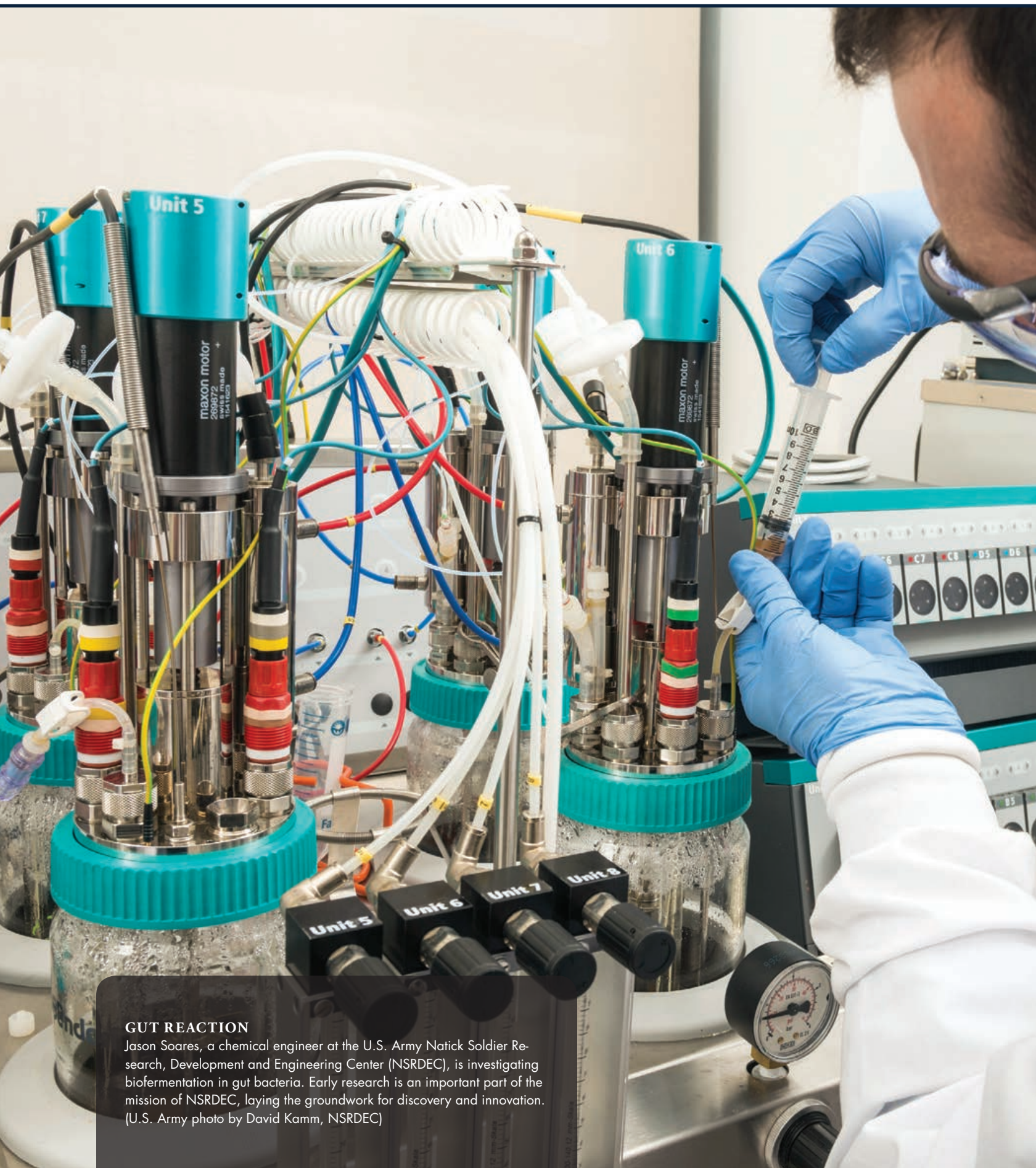
The second contribution was when I was a branch chief and managed the program to upgrade the sensor technology for the Thermal Weapon Sight (TWS) through PM Soldier Sensors and Lasers under PEO Soldier. The original TWS was a cooled, scanned, forward-looking infrared (FLIR) sensor using a linear infrared detector that scanned in one direction to create an image. We introduced a new sensor design for an uncooled, staring FLIR that uses a two-dimensional infrared detector, eliminating the need to scan and allowing us to remove some moving parts. The revised design increased reliability and lowered the cost while maintaining performance. We reduced the size and power requirements by 50 percent.

### **What advice would you give to someone who aspires to a career or position like yours?**

Seize every opportunity that is presented for training and certification in multiple career fields. Sometimes we get wrapped up in the job we are doing, and we're not always aware of the openings or positions that would be available with additional training. Knowledge of multiple career fields allows you to understand how the Army works from a life cycle management perspective. The Army is responsible for so many different aspects of the acquisition system that to fully understand it, you need to have many different perspectives, and you can only obtain these perspectives by living them. So seize the opportunity!

—MS. SUSAN L. FOLLETT





#### GUT REACTION

Jason Soares, a chemical engineer at the U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC), is investigating biofermentation in gut bacteria. Early research is an important part of the mission of NSRDEC, laying the groundwork for discovery and innovation. (U.S. Army photo by David Kamm, NSRDEC)



## NEWS ANALYSIS

# MAKING INNOVATION HAPPEN

The U.S. military is at a historic crossroads, as DOD acknowledges that indisputable U.S. military dominance is a thing of the past. As DOD and the Army seek to marshal all possible resources to drive innovation and provide the latest capabilities, a picture of collaboration emerges, but it's far from complete.

*by Ms. Margaret C. Roth*

**A**fter 40 years of unquestionable U.S. military dominance over its adversaries, Pentagon officials say that our decisive advantage is gone. Defense research and development (R&D), an indisputably powerful engine of innovation, has taken a sizable hit in the past decade. That is also true of industry's own, invaluable independent R&D (IR&D), but for different reasons. Deficit-driven budget cuts have reduced DOD spending on R&D by 18 percent from FY06 to FY16, according to the American Association for the Advancement of Science. The Army itself has seen a 49.8 percent reduction in R&D spending during that time.

U.S. industry's IR&D expenditures now greatly exceed the government's, and foreign IR&D expenditures greatly exceed the sum of both U.S. government and industry R&D. But within the U.S. defense industry, IR&D spending has declined. While the decade following 9/11 saw a significant rise in sales of defense and security systems, industry's investments in IR&D were not so dramatic. As a percentage of sales, IR&D investments by top defense contractors declined by nearly one-third between 1999 and 2012, according to a 2014 report by the Information Technology & Innovation Foundation.

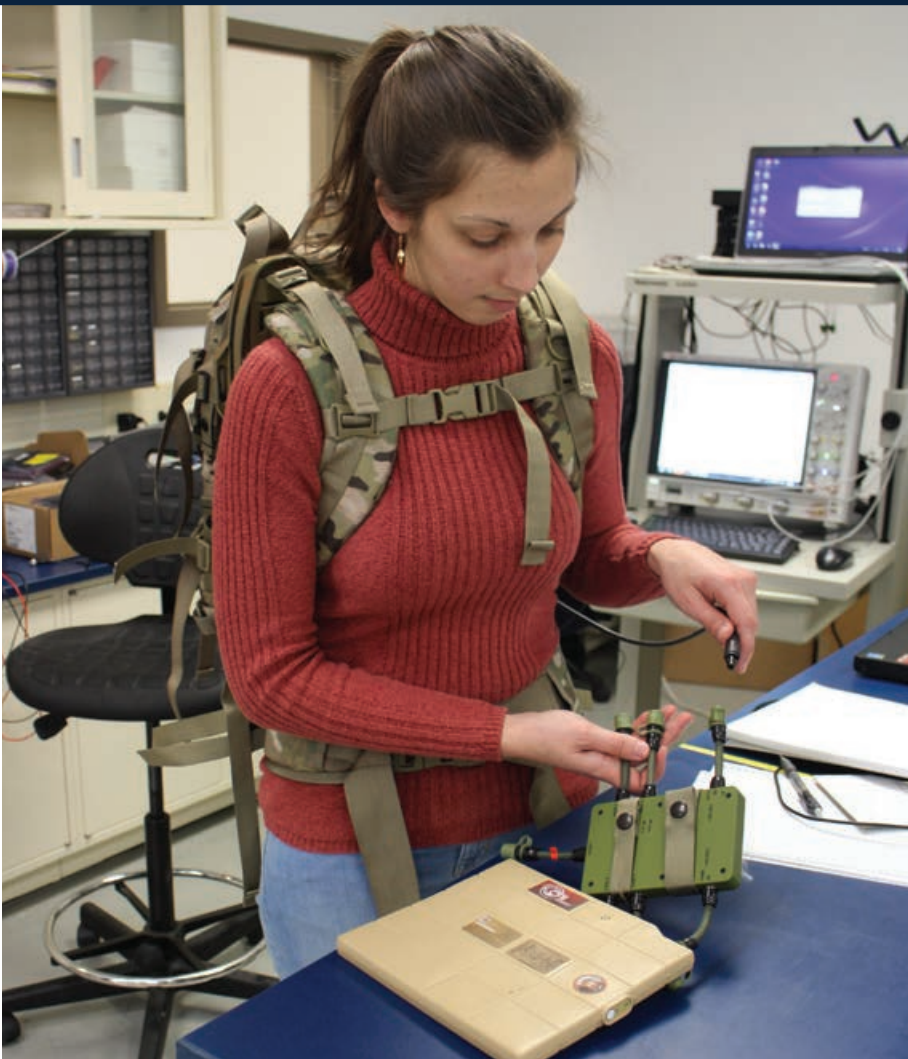
## ENHANCEMENT OVER ADVANCEMENT

For the past 15 years, the focus for both DOD and the defense industry has been on delivering near-term solutions to warfighters in theater, primarily in Southwest Asia, and DOD has spent trillions of dollars on the conflicts in Iraq and Afghanistan. On the conservative end of the spectrum of estimates, the Congressional Budget Office puts the total cost of both wars at \$1.6 trillion to \$1.65 trillion from FY01 to FY15, based on spending from DOD's overseas contingency operations account.

At the same time, Congress has focused its attention on the ongoing conflicts, not on the long-term viability of the defense acquisition system. Most of the effort to rein in acquisition inefficiencies has resided in DOD's Better Buying Power initiative, leading to measurable dollars saved and costs avoided but nowhere near the scale envisioned by proponents of systemic acquisition reform in the Pentagon and on Capitol Hill. They are looking for ways to control acquisition practices that, over the past several decades, have led to development and procurement costs averaging 20 to 30 percent more than DOD's initial figures, by congressional estimates.

Meanwhile, the current global picture is a far cry from that of the Cold War era, when the United States competed head to head with known adversaries for the next, best military capability. Indeed, Pentagon officials see multiple potential threats: the military modernization and expanding capabilities of several nations, including China and Russia and, to a lesser extent, North Korea and Iran; instability in the Middle East and Africa; and terrorists worldwide.

The slowdown in defense-related R&D of all stripes and the continued lack of



## ENERGETIC INNOVATION

Julie Douglas, an engineer at the U.S. Army Communications-Electronics Research, Development and Engineering Center's Command, Power and Integration Directorate (CERDEC CP&ID), demonstrates the Integrated Soldier Power and Data System, which ultimately will harvest energy to charge a conformal battery worn by Soldiers to power all of their wearable electronic equipment. The U.S. military is broadening its search for new capabilities to give warfighters a decisive advantage. (U.S. Army photo by Kathryn Bailey, CERDEC CP&ID)

funding mean that the services increasingly must seek to enhance capabilities with innovative, commercial off-the-shelf technologies. Those solutions meet warfighters' needs at an economical cost but, as DOD leaders point out, provide little advantage, since they are available to anyone, friend or foe. The defense industrial base has responded to the changes in military missions and strategies by focusing primarily on meeting DOD's near-term needs. For the prime contractors with

established major weapon systems and the small companies that do not have commercial sales to leverage and must diversify quickly or perish, there has been little incentive to venture into dramatically new solutions.

## A CONCEPT THAT'S EASIER TO DEFINE THAN TO DO

Now that the U.S. military is at this historic crossroads, how will it continue to provide warfighters with capabilities that

FIGURE 1

give them a decisive advantage over current and as-yet undefined enemies?

Innovation, among other things. As a concept, “innovation” has become a buzzword, and it is also becoming a major policy thrust, gaining momentum daily throughout DOD. But what does it really mean? According to Merriam-Webster, innovation is: 1) the introduction of something new; or 2) a new idea, method or device.

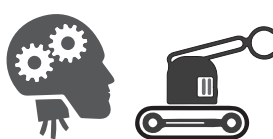
But defining something is vastly easier than actually doing it. Innovation has many different shades of meaning for the various defense communities—in acquisition, logistics, science and technology (S&T), industry and academia—not the least of them industry, tasked with actually converting requirements into concepts and concepts into products.

The word “innovation” carries enough nuance to confuse rather than clarify. The words “enterprise,” “collaboration,” “culture,” “agility” and “responsiveness” pop up frequently. So do the terms “knowledge sharing,” “intellectual property,” “return on investment,” “life cycle management,” “constrained resources” and “better buying power.”

The Army Operating Concept, “Win in a Complex World,” defines innovation as “the result of critical and creative thinking and the conversion of new ideas into valued outcomes. Innovation drives the development of new tools or methods that permit Army forces to anticipate future demands, stay ahead of determined enemies, and accomplish the mission.” In other words, it is more than technology; it is new ways of thinking about technology.

In this swirl of words, all fraught with a growing sense of urgency, each of the

## Innovation opportunities for prototyping and experimentation



### Autonomy and robotics



### Biomedical



### Electronic warfare and cyber



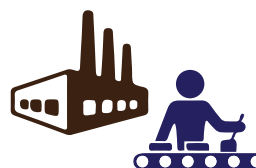
### Future of computing and microelectronics



### Hypersonics



### Directed energy



### Manufacturing

#### SEIZING OPPORTUNITY

The Hon. Stephen P. Welby, ASD(R&E), outlined opportunities for innovation within DOD at the second Army Innovation Summit at Aberdeen Proving Ground in April. Welby believes DOD needs to “regrow some of the muscle tone that we had” during the Cold War. (SOURCE: Office of the ASD(R&E))

stakeholder communities is grappling with how to interpret innovation within its own world and how to join forces with the other communities to actually make it happen, all within the constraints of congressional oversight.

Industry, in particular, is seeing its role evolve from one of meeting established (though not always clearly defined) requirements for well-funded programs. It is being asked to meet a much broader array of nascent needs with its IR&D funding, as DOD and the Army seek



to get ahead of the technological curve and provide Soldiers with the capabilities needed for overmatch. The opportunities for industry to innovate are increasingly diverse—but where's the payoff? The question is central to building the “culture of innovation” that DOD wants, a culture of ideas, agility and open doors between government and the private sector that is as nimble as a mouse compared with the mammoth that is DOD now.

Army AL&T looked for answers to this and many other questions, from leaders in government, industry and academia. All had ideas on what still needs to happen.

## THE ROOTS OF INNOVATION

That question, “Where's the payoff?” is not an insignificant one. Historically, American ingenuity has often been

characterized by a garage, a great deal of passion, countless hours or years of un- or underpaid work, a prototype and hopes—sometimes realized, often not—of a massive payoff down the road. So, while founders of startups that now stand as Fortune 500 or 100 companies could only have dreamed of the riches they might make, they still dreamed. But dreams without passion, work and investment are just dreams.

Innovation is hardly a new concept to DOD, of course, but DOD is not a startup with grand dreams and an open horizon. The obstacles that innovators face within DOD are as real as the urge to make innovation happen: resistance to change, lack of leadership interest and limits on funding. (See Figure 3, Page 69.)

A prime example from Army history is the tank prototyping and experimentation from World War I to the beginning of World War II, which led to the integration of tanks into the Army's mechanized combat arms formation. “Tank prototyping was driven by the imperative to find an alternative to embedded trench warfare tactics used in World War I,” wrote Dr. Edie Williams, a consultant to the assistant secretary of defense for research and engineering (ASD(R&E)), and Alan R. Shaffer, then principal deputy to the ASD(R&E), in their article “The Defense Innovation Initiative: The Importance of Capability Prototyping” (Joint Force Quarterly, 2nd Quarter 2015).

“These efforts emerged from midgrade military officers driven by ideas for new tactics and employment techniques who challenged industry to develop technology that would facilitate their ideas,” the authors wrote. The midgrade officers who led the effort were George S. Patton and Dwight D. Eisenhower, who had no way of knowing that their work ultimately would enable allied tank warfare to dominate World War II.

“Early on, though, Patton and Eisenhower argued against conventional TTP [tactics, techniques and procedures] wisdom and for using tanks as a separate arm of the fighting force not merely in support of the infantry.” The officers received scant support for their views, Williams and Shaffer wrote. “After World War I, Army leadership, supported by Congress, disbanded the small tank units being used for experimentation and subordinated the few tanks that were left to the infantry.”

Eisenhower and Patton continued experimenting and developing doctrine and TTPs, but the R&D funding all but evaporated. “Both officers were reassigned and the development of tanks stagnated.”



## NEW ARMORED TACTICS

Soldiers of the 55th Armored Infantry Battalion and a tank of the 22nd Tank Battalion move through a smoke-filled street on April 22, 1945, in Wernberg, Germany. Between World War I and World War II, tank warfare evolved from merely supporting infantry to separate armored units. (Photo by Pvt. Joseph Scrippens courtesy of National Archives and Records Administration)



### QUICK FIX

The U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC) provides first-of-its-kind training to Army welders to repair Stryker brigade combat team vehicles in the field, returning the Stryker to the commander much more rapidly. Innovation involves both better products and better processes. (U.S. Army photo by Kimberly Bratic, TARDEC)

Congress subordinated tanks to the infantry in 1920, and the Army built a grand total of one tank prototype between 1925 and 1931.

That was not the end of tank development, however. A couple of senior leaders in particular—Brig. Gen. Samuel D. Rockenbach, formerly the first chief of the U.S. Army Tank Corps, and Secretary of War Dwight F. Davis—kept the momentum from dwindling to zero. The groundbreaking ideas Patton and Eisenhower had developed about a new armored force received more top-level support from Gen. Douglas MacArthur. In 1930, as the new Army chief of staff, MacArthur launched an effort to mechanize the force with a particular emphasis on tanks. With a battle plan that Eisenhower authored, the newly established Louisiana Maneuvers, designed to prepare the Army in anticipation of World War II, successfully field-tested the mechanized force in 1941.

“They force-fed change to an institution that otherwise was only beginning to shake off its prewar somnolence,” Williams and Shaffer wrote.

The authors drew strong parallels between the introduction of tank technology and the experimentation efforts that followed, and the current military era: “declining defense budgets, shrinking force

levels, limited research and development funding, and doctrinal and political debates about the character of warfare in the future.”

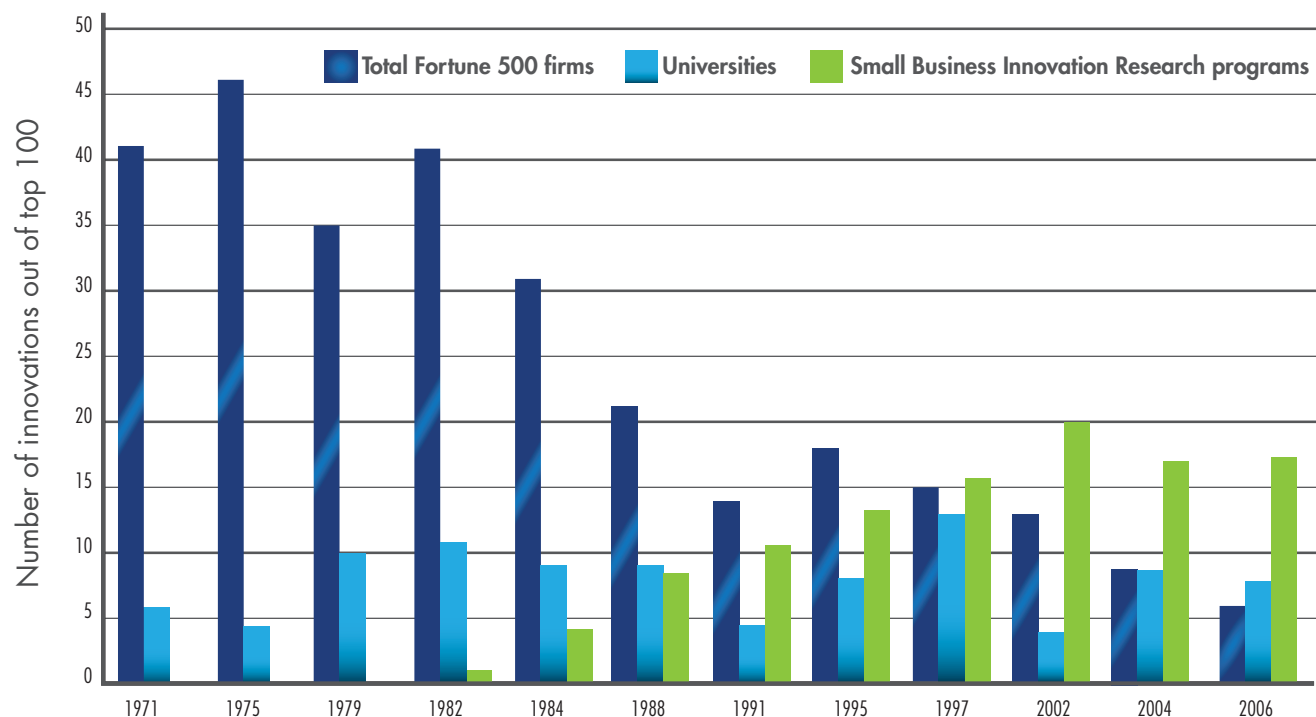
“The first lesson to be learned is that, with limited resources, prototyping and experimentation are good investments. A second lesson is that doctrine based on past wars is not usually valuable when preparing for future conflicts. The final lesson is that there are always young men and women such as Eisenhower and Patton in our ranks who have creativity in their DNA. They should be allowed to share it within a system that supports agility and innovation.”

### FACING THE THREAT

Those lessons remain relevant, based on a presentation April 5 by the Hon. Stephen P. Welby, ASD(R&E), on the future of defense innovation. Welby addressed the second Army Innovation Summit, held at Aberdeen Proving Ground, Maryland. The summit is a series of quarterly forums organized by the U.S. Army Materiel Command (AMC) to bring together major players to discuss barriers to innovation and ways to surmount them.

Welby compared the present day with the early 1980s, when the U.S. military broke new ground in precision weapons, coupled with long-range intelligence, surveillance and reconnaissance; stealth; and complex global battle networks. The U.S. was the only country to have all those capabilities, he noted.

FIGURE 2



#### FORGING NEW PATHS FROM SMALL STARTS

Fortune 500 companies, once the drivers of key innovations, are now taking a back seat to small businesses. (SOURCE: "Where Do Innovations Come From? Transformations in the U.S. National Innovation System, 1970-2006," by Fred Block and Matthew R. Keller; July 2008, Information Technology & Innovation Foundation)

"We have had a remarkable advantage, from a historical perspective, over the last 40 years," Welby said, "but that asymmetry ... is over." The pipeline of cutting-edge capabilities has slowed, he noted, which concerns defense and industry leaders alike.

"I feel uncomfortable when our senior leadership in the department, [in] the Army, on the Hill, [have] told us we're behind, told us we're challenged. And I think that should make you uncomfortable," said Welby, who is DOD's chief technology officer and the principal adviser to Defense Secretary Ash Carter on matters relating to science, technology, research and engineering.

As the ASD(R&E), he looks at global intelligence reports every morning. "I have looked up my counterparts around the world. I wonder what the technology leaders in those [countries] that do not wish us well are doing at their desks every morning, and quite frankly, I think they've got an easier job than we do. I see

significant challenges that we face in terms of preparing for the future."

During the past 15 years of intense conflict in Southwest Asia, with a focus on counterinsurgency and anti-terrorism, "we have not spent as much time as we should have living in the future, thinking longer term and thinking about the threat, thinking about how the threat pictures us, thinking about how the threat thinks about our vulnerabilities," Welby told the audience.

Given the unrelenting pace of change over the last two decades—in technology, in business, in organizations, in the globalization of talent and technology, in shifting global supply chains, in the nature of the future threat—"it's critical ... that we are thinking about our response to that kind of threat. And as I look across the department, quite frankly, the place where I see the greatest challenge is in the United States Army. It's an institution that I deeply love, but I'm very concerned that we need to be



thinking much more about how we prepare for future threats and how we create the opportunities to ensure that we'll have the decisive advantage."

That will require fundamental changes in thinking, and not just in the Army, said Welby. It will require more than multiple initiatives called "innovation," which he acknowledged is "a big buzzword" in the federal government these days.

"Innovation is about change," he told the summit audience. The Better Buying Power (BBP) initiative is an important part of it, he added, as it frees up resources to make it possible to explore more capabilities. (See Figure 4, Page 70.)

"I'm very encouraged that we're meeting here today. I encourage you not to be simply thinking about preparing material to support Innovation Summit 3 but that you're thinking about things that you can do to help change what you're doing today."

### TARGETING CHANGE

The concept of change itself covers an even wider universe than innovation, and it poses a much bigger challenge for institutions as big and complex as DOD, the defense industry, Congress and segments of academia with long-standing ties to

DOD. Leaders in DOD, industry and academia agree that a cultural change is necessary in the defense world to create the freedom to innovate. While BBP has made some inroads to changing the way people think about acquisition, culture change within DOD or any of its institutional stakeholders may be significantly more difficult than innovation.

From Welby's perspective, DOD needs to "regrow some of the muscle tone that we had" during the global competition of the Cold War era, shaping future efforts to best our potential military adversaries so as to create a long-term, disruptive, i.e., game-changing advantage for the United States.

In an interview with Army AL&T, the Hon. Jacques S. Gansler, former undersecretary of defense for acquisition, technology and logistics and now chairman and CEO of the ARGIS Group (Analytical Research for Government and Industry Solutions), pointed out a number of areas where the U.S. military is no longer ahead:

- **Night vision.** The French have captured the world market in part because France does not restrict the export of night vision devices (as the U.S. does),

and it has reinvested the earnings from international sales to advance the technology.

- **Supercomputing.** The Chinese have the world's leading supercomputer; it was developed by the National University of Defense Technology, run by the People's Liberation Army. It is worth noting, Gansler said, that a large percentage of the parts come from U.S. manufacturers.
- **Vehicle armor.** Israel leads in this area, as the U.S. military has found in seeking to armor the next generation of infantry fighting vehicles. With encouragement from U.S. military leaders, Plasan North America—a branch of an Israeli company—now operates a factory in Michigan, satisfying the congressional mandate that DOD "buy American." Gansler is on Plasan North America's board of directors.

Other countries are also pushing for innovation, Gansler noted—among them China, India, Israel and Singapore—primarily with a "top-down," government-driven approach.

The United States can and should take maximum advantage of innovative

### FOREIGN TECH

The Tianhe-2 at the National Supercomputer Center in Guangzhou, China, is ranked as the world's fastest supercomputer. Developed at the military-operated National University of Defense Technology, the system represents one of several areas in which U.S. military technology is no longer dominant. (Photo courtesy of Wikimedia Commons)





## ENHANCING THE NETWORK

To improve operations in the field, CERDEC looks at the interoperability and efficiency of communication capabilities for expeditionary forces and troops on the move, including hardware convergence, network simplicity and cellular and intra-Solider wireless capabilities. Interoperability is a key focus for U.S. military research, engineering and prototyping efforts to expand or enhance existing capabilities. (U.S. Army photo by Kelly White, CERDEC)

technologies and processes developed by U.S. industry and allies and, in some cases, by U.S. industry for allied nations, Gansler said, citing the United Kingdom's adaptation of global commercial logistical systems to improve its military supply chains. Even innovations in processes can prove to be disruptive, he said.

## DISRUPTIVE VS. INCREMENTAL

Yet disruptive technologies, by definition, are not initially welcomed by large institutions like the big defense contractors or the DOD acquisition system, Gansler noted.

Drawing a sharp distinction between large and small companies, he observed that large corporations have a strong tendency to discourage disruptive innovation in favor of incremental innovation that is consistent with what they're accustomed to producing. "That's why so many innovations come from small business," Gansler said, "because people are trying to build a business." It's the difference between making "a little bit better widget each time" and asking, "Why do we need widgets?" and replacing them with something completely new and different.

"That kind of [disruptive] innovation is what makes a big difference in warfare, and certainly it makes a big difference commercially. It may start up a whole new industry," Gansler said. "That's got to be encouraged, and it's actually discouraged

in both large organizations and in many cases by the military because it's disruptive."

In fact, "most innovations today come from small businesses," Gansler said, citing the 2015 findings of a committee he chaired of the National Academies of Sciences, Engineering and Medicine. The Committee on Capitalizing on Science, Technology and Innovation, which reviewed the Small Business Innovation Research (SBIR) and Small Business Technology Transfer programs at DOD, NASA, the National Institutes of Health, the U.S. Department of Energy and the National Science Foundation, concluded that SBIR remains the single largest innovation program for small business. (See Figure 2, Page 62.)

Another institution that has proven resistant to innovation and change is Congress, Gansler said. The Code of Federal Regulations, which controls what the government can buy, and by what means and method, "is now up to 186,000 pages," with over 2,000 pages added every year. It is full of regulations that slow down the application of effective, affordable commercial equipment to military systems and significantly raise the prices, Gansler said. Congress needs to review all 186,000 pages, drop the obsolete ones, and revise those that are expensive and unneeded; it's considering a step in that direction, he said.

## NEW TALENT, NEW IDEAS

At the Innovation Summit, Welby noted that regaining superiority by creating strategic challenges for adversaries is going to require more talent, with a greater diversity of expertise, coupled with a faster response to innovative possibilities. The idea is to "open the aperture," as he put it, to expand on the talents of over 113,000 scientists and engineers working for DOD by engaging in new ways with academia and industry,

*"When was the last time the Army or [DOD] really built a new platform? You can pretty much trace when we started running into problems to when we 'won' the Cold War and we stopped building things."*

even—especially—sectors of industry that traditionally have not associated with DOD, such as the tech companies of Silicon Valley.

Welby remarked that, on a recent visit to Silicon Valley, a host company asked him not to sign the visitors book in the lobby. Puzzled, he asked why and learned that his host did not want potential investors to see that the company was talking with DOD. An April 22 article on DefenseOne.com demonstrated why, noting that “CEOs said the sluggish pace of Pentagon contracting is preventing commercial tech firms from responding to the entreaties of Defense Secretary Ash Carter and other DOD players. Prime contracting processes can take a decade, far longer than Silicon Valley investors are willing to wait for a return on their investment.”

Which is why it’s imperative to speed up the notoriously slow DOD procurement machine to take advantage of innovative, strategically important opportunities before they disappear, Welby said.

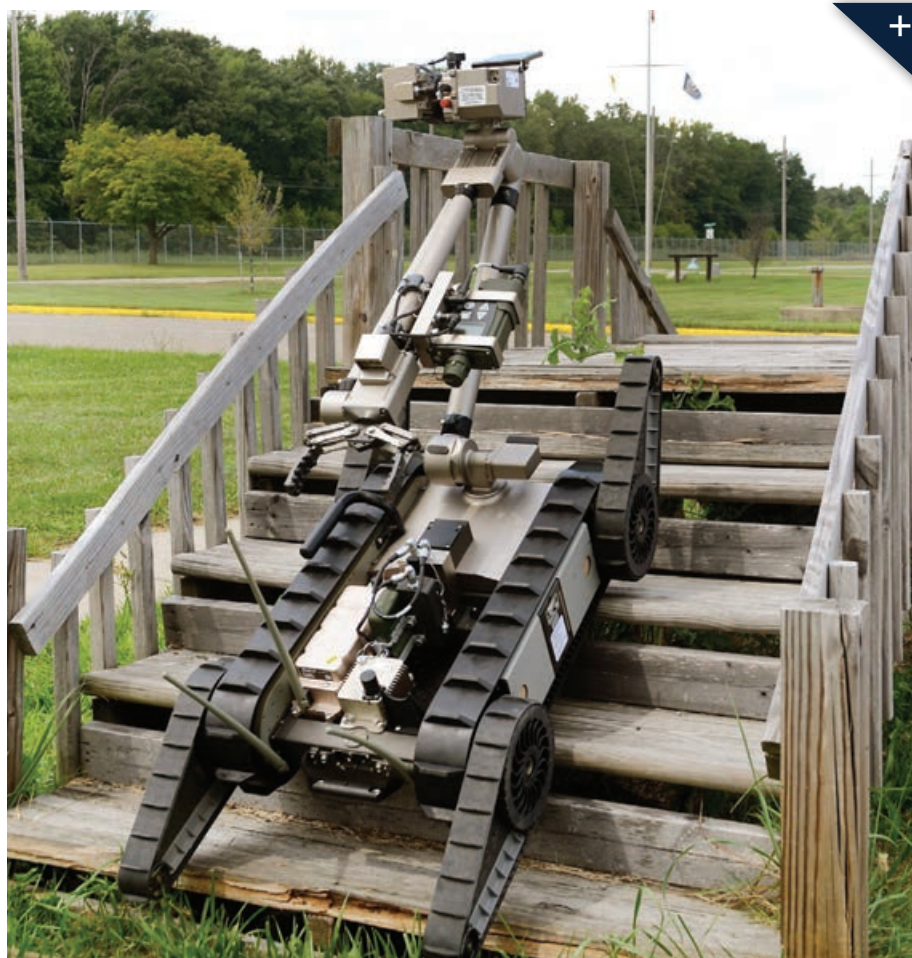
“We can’t afford 10-year programs,” Welby continued. Instead, DOD needs to do more prototyping of potential solutions, “making small bets” to get a head start on the technology, even though they may be small, incremental or, ultimately, false starts. “I’ve never seen a surfer surf a wave from behind,” he remarked. (See Figure 1 on Page 59.)

The Pentagon is looking hard at contracting timelines, he added, noting that DOD has talked to some angel investors—affluent individuals who provide startup capital, usually in exchange for ownership equity—and found that they work in six-month time frames; that’s how long a product has to prove viability. “That’s the horizon, not a 30-year horizon,” Welby said.

Pervading all of these considerations is the central theme of affordability, he said, both in good stewardship of taxpayer money and in “how we prove the effectiveness of everything we do” across the life cycle, from conceptualization through delivery and exercise to disposal. “That efficiency allows us to do more ... to free up resources to allow us to create those options.”

## CULTURE SHOCKS

To bridge the biggest gap with industry, the one that has Silicon Valley companies viewing DOD as potentially toxic to business, the department has developed a cultural exchange, so to speak, whereby DOD assigns military officers and senior civilians to work for a while in Silicon Valley because, Welby said, “We need folks who speak DOD and speak Valley.” Conversely, DOD has had early success



## INNOVATING SAFETY

The PackBot 510 robot—capable of assessing chemical, biological, radiological, nuclear and explosive threats—undergoes final testing late last year at the Army’s Robot Logistics Support Center at Selfridge Air National Guard Base in Michigan. Given the limitations on resources, prototyping and experimentation can prove to be good investments for the U.S. military. (U.S. Army photo)



in bringing into the Pentagon tech executives who have left one company or venture and not yet started with another.

Carter wants to “drill tunnels through the walls of the five-sided building,” Welby said, to establish a “permeability” whereby new ideas can move more freely between the defense community on the one side and industry and academia on the other.

After more than 30 years working in S&T, including the defense aerospace, automotive and energy industries, James S. Chew is not surprised at the reluctance of Silicon Valley entrepreneurs to work with DOD. Chew, who for the past eight years has chaired the Science & Engineering Technology Division of the National Defense Industrial Association, specializes in product development, operations and marketing and is currently director of strategic development for a top-50 defense contractor. He spoke with Army AL&T as someone with experience in the defense industry, specifically S&T, not as a representative of either the association or his company.

“I get my thrill out of developing new technologies and demonstrating what is the state of the art,” Chew said, “what is now possible because of clever people in technology [and] clever people who figure out how to design and integrate these new technologies to really do what I call ‘delight’ people, meaning we’re now doing stuff that people didn’t know they needed until they saw it, and now that they see it, they can’t live without it.”

Even established defense contractors have grown alienated from the Pentagon, he said, in part because of laws that have created institutional fences between government and industry. As a result, “Instead of us knowing what each other wants, we’ve got this mutual distrust of each other, and that’s why you’re seeing this lack of innovation,” he said. “You’ve got companies saying they’re not going to do anything unless they see a requirement, and you’ve got the department saying, ‘I need to understand what you’re doing in IR&D because I don’t think you’re doing what needs to be done.’

“[This] is why you’re seeing a lack of Silicon Valley companies actually wanting to jump in, because of all the rigors of working on defense contracts, which is frankly kind of silly.”

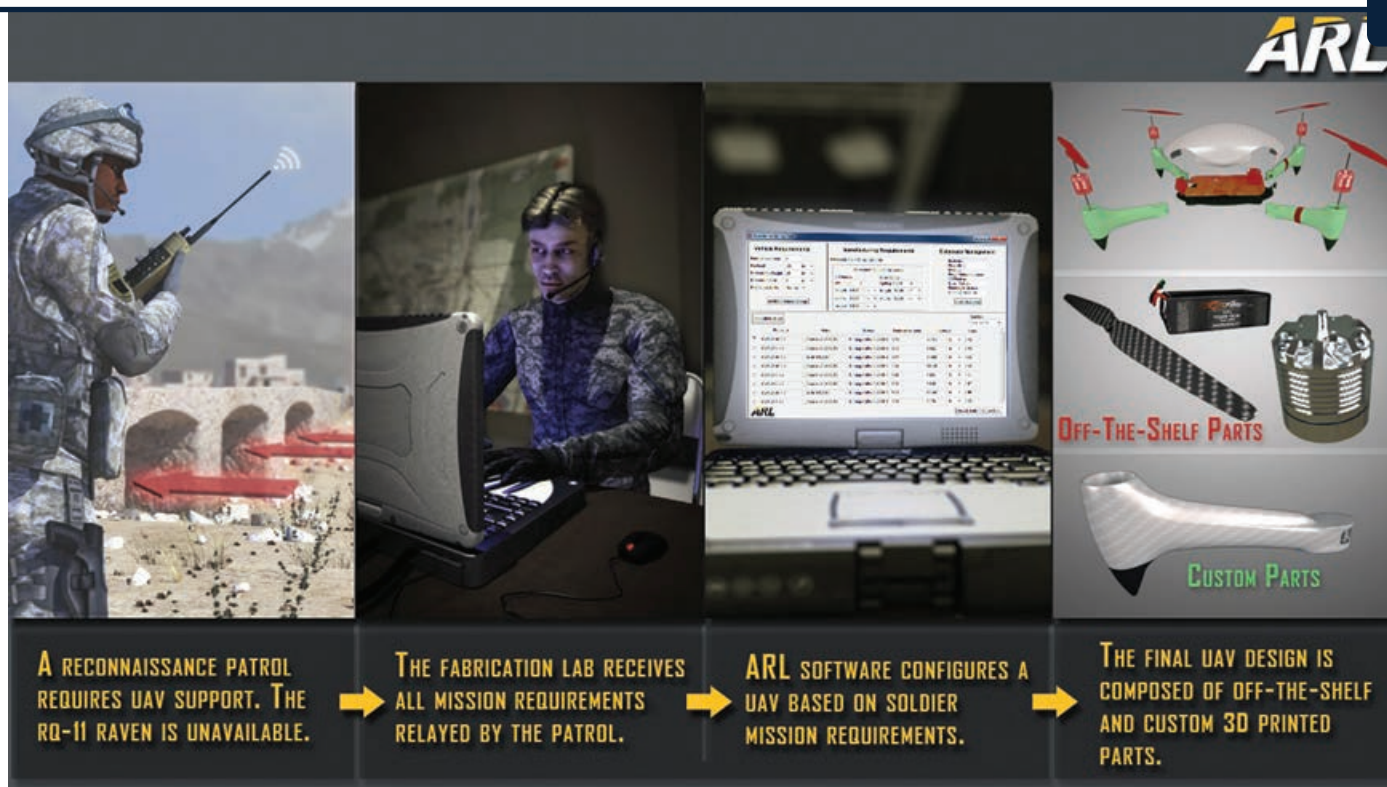
Chew added that “Congress needs to step up” as well. Legislators waste considerable time, both on Capitol Hill and in DOD, on numerous reports mandated many years ago that are now of questionable value, he said. “Nobody has had the courage in Congress to say that any reporting requirement that’s over four years old, unless specifically required by Congress, will be rescinded.” More broadly, he said, instead of criticizing what they call wasteful spending by DOD and the defense industry, “I just don’t see too many members of Congress—and frankly I wonder how many of them have business experience or industry experience—coming to the table ... and saying, ‘We’ve got to work with these guys [DOD and the defense industry].’ ”

Chew cited the F-22 Raptor fighter jet as an example of a defense acquisition program fraught with the kind of indecision and unpredictability that discourages innovators from entering the defense market. When the Air Force developed a requirement for the stealthy fifth-generation fighter jet in the early 1980s, it was for 381 aircraft. The total requirement was for 749. But the last F-22 was produced in 2009, for a total 187 aircraft. Now a House Armed Services subcommittee wants the Air Force to explore restarting production “in light of growing threats to U.S. air superiority as a result of adversaries closing the technology gap and increasing demand from allies and partners for high-performance, multirole



### WIRED INTO TECHNOLOGY

On April 13, the U.S. Army Research Laboratory (ARL) and the University of Southern California Institute for Creative Technologies formally opened ARL-West, a new facility that brings S&T knowledge not readily available on the East Coast into the ARL fold. “Innovation does not only take place in Army labs,” said Dr. Thomas Russell, acting deputy assistant secretary of the Army for research and technology. (Photo by Tom Faulkner, U.S. Army Research, Development and Engineering Command)



#### ENVISIONING THE FUTURE

ARL researchers envision a future where Soldiers identify mission requirements and receive, for example, a customized unmanned aerial vehicle (UAV) fabricated through 3-D printing with local assembly. Innovators face obstacles that DOD and Army leadership, among others, are attempting to find ways around: resistance to change, comfort with the status quo and limits on funding. (U.S. Army illustration)

aircraft," according to language in the committee's report accompanying the House-passed H.R. 4909, the National Defense Authorization Act for Fiscal Year 2017.

"That's the type of wackiness that any sound businessman would look at and say, 'Why do I even want to think about going into that kind of a market?'" Chew said.

#### GETTING BACK TO BUILDING

Ultimately, Chew believes that the best way for DOD and the services to spark innovative solutions is to direct innovation by building materiel. Industry needs predictability, a regular workflow to keep assembly lines going, he said. "We're not building anything. We're not at war, where we have an immediate need to

transition certain types of technologies. People forget that if it wasn't for NASA, we wouldn't have Velcro. ... When there's a need for the industry and [DOD] to be innovative, despite all the problems they have—the inefficient bureaucracy, the shortsighted companies—when they need to step up, they step up. The problem is that the occasions to step up are few and far between."

The Information Technology & Innovation Foundation details the recent drop in industry IR&D spending in its 2014 report. The report, by Dr. Dan Steinbock, noted that, in 1999, the combined spending of Boeing's defense unit, L-3 Communications, Lockheed Martin Corp., Northrop Grumman Corp. and Raytheon Co. was \$2.4 billion on R&D,

which represented 3.3 percent of sales. By 2012, combined sales had more than doubled, while the combined R&D expenditures grew by about one-half, causing the R&D share to fall to 2.3 percent of sales. In 2013, this ratio ranged from about 1.3 percent to 3.6 percent among the five large defense companies. This percentage decline, while not dramatic, is in sharp contrast with the commercial technology sector. In 2012, the same five large defense companies spent a total of \$5.1 billion on R&D projects, whereas five leading U.S. technology companies—Microsoft Corp., Intel Corp., Google Inc., Cisco Systems Inc. and IBM—invested almost \$38 billion in R&D during the same period, representing 5.3 percent to 19 percent of their sales.

Steinbock said that one reason that defense companies may be spending less on IR&D is to keep expenses down and present more attractive bids for DOD contracts, in line with changes in Pentagon procurement policy that give greater emphasis to lower-cost procurement, particularly to source selection concepts such as “lowest price technically acceptable.”

“R&D expenditures in the commercial technology sector can and do lead to significantly increased revenues from growing markets.” In contrast, Steinbock said, “in an era of declining defense procurement, R&D expenditures for defense at best let a firm get a slightly larger slice of a smaller pie—hardly a compelling proposition for shareholders.”

“We still are operating in a defense industrial world that’s based on the ’50s and the Cold War, where we had one common enemy, and that enemy had one common enemy, and we kind of knew what needed to be done,” Chew said. Since then, like the U.S. automotive industry in the 1980s, the defense industry has lost its bearings, and “they don’t really know what to invest in.” Meanwhile, defense companies “are doing everything that they can to squeeze the last dollar out of their existing product line. [They’ve] got to fill [their] assembly lines, at the end of the day.”

“When was the last time the Army or [DOD] really built a new platform? You can pretty much trace when we started running into problems to when we ‘won’ the Cold War and we stopped building things,” Chew said. Previously, “Every time you designed a main battle tank, you knew there was another main battle tank on the drawing boards right after that, and the same with the Air Force: Every time you designed a new fighter, you knew there was a new fighter on the drawing boards after that. In the Navy, every time you designed a new surface vessel, you knew there was one after that.

“That’s why it’s so important to build stuff. You have to keep people active. There’s no such thing as a technology faucet; you just can’t turn it on, and there it is. There’s also no such thing as an acquisition or design faucet. Look at what happened when we stopped developing rotary-wing aircraft,” Chew said. With respect to rotary-wing innovation, he explained, “You see the commercial guys absolutely cleaning the department’s clock.”

Even the development of the Future Vertical Lift (FVL) program appears to be a shortsighted solution, Chew said. (See “A Big Lift,” Page 108.) The notion that the aircraft will have to be designed to last 30 years with incremental improvements because the Army probably won’t build a new rotary aircraft in that time

frame flies in the face of innovation, he said. “Can you imagine if Apple actually had that philosophy on the iPhone? ‘This is going to be the last iPhone that people are ever going to want to buy, so it’s got to last 30 years.’ [Apple would] never get anything out.”

In the same vein, DOD should focus on awarding valuable R&D projects to companies that can produce something from the R&D, not organizations such as big laboratories or universities that don’t make anything, Chew said. “If you really want to have innovation in the industrial base, then focus on the industrial base.” Awarding contracts to entities that don’t have a manufacturing base is a recipe for “unbuildable systems that don’t transition,” said Chew.

Overall, Chew is skeptical about the substantive benefits of DOD’s innovation push. “When you start dictating innovation, that’s like dictating creativity. If you really have to talk about innovation, you have to ask yourself, what are you really doing?” he said. But he applauded DOD’s push for more prototyping and experimentation of emerging capabilities, specifically the Office of the Deputy Assistant Secretary of Defense for Emerging Capability & Prototyping, under the ASD(R&E): “Give me your idea and let’s see what we can do with it,” as Chew put it.

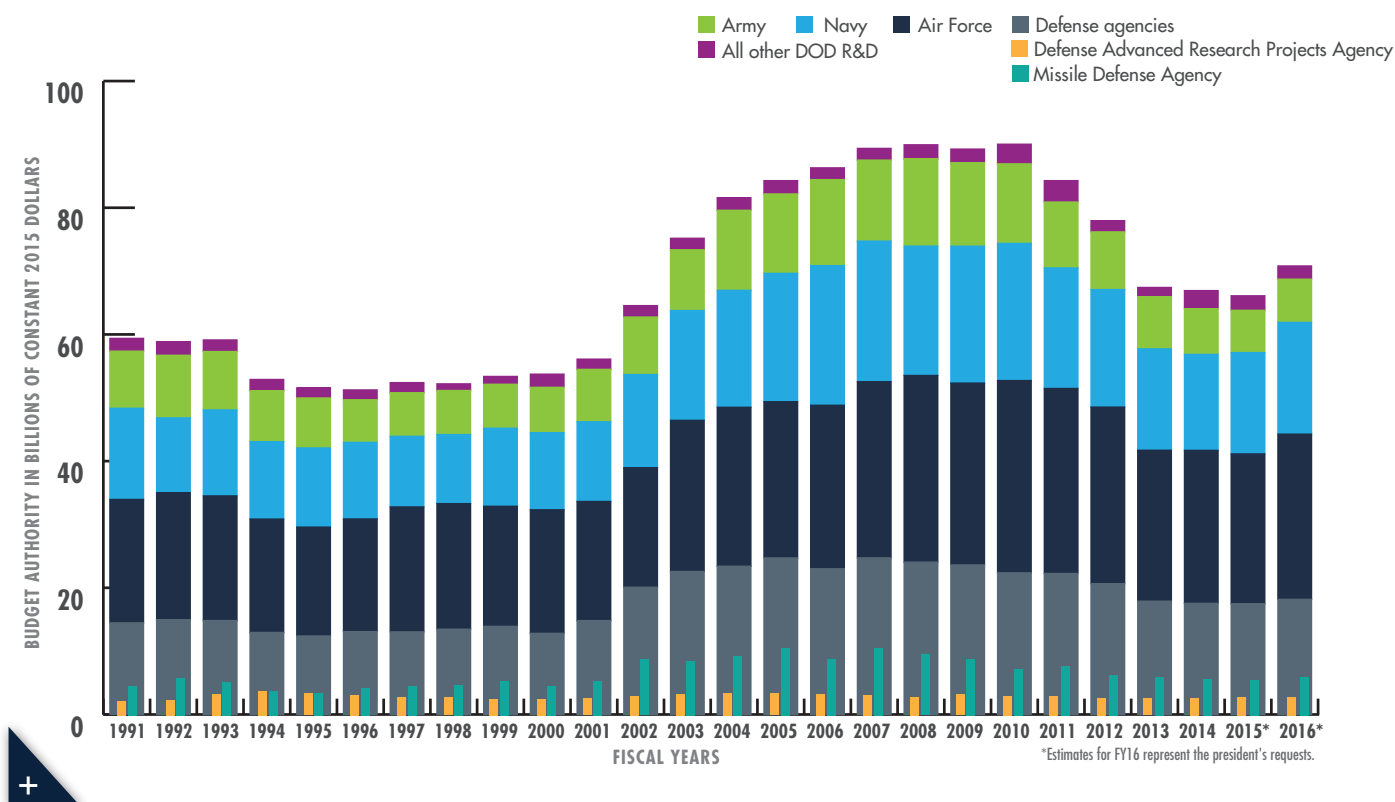
Even with that commitment to innovation, Chew said industry is likely to approach warily, “because again, a lot of stuff that you do with the science and technology and advanced concepts in the prototyping world is, frankly, knocking current rice bowls. Nobody likes that.”

He also sees promise in defense-industry exchanges to broaden each side’s understanding of how the other works and how they could work better together.

*Disruptive technologies, by definition, are not initially welcomed by large institutions like the big defense contractors or the DOD acquisition system.*



FIGURE 3



### DEFENSE R&D, BY THE NUMBERS

A look at DOD spending on R&D, from 1991 to 2016. (SOURCE: American Association for the Advancement of Science, based on agency budget data)

### SEEKING SOLUTIONS

The innovation “buzz” is clearly a lot louder now than when it began in the early part of this decade with the Defense Innovation Marketplace, which opened at <http://www.defenseinnovationmarketplace.mil/> in January 2012. The marketplace has produced concrete results by providing a secure portal where industry can learn about DOD investment priorities and technology requirements, and DOD can get the word out about current and future S&T and R&D priorities, events, presentations and solicitations to meet the warfighter’s needs.

The marketplace provides the knowledge for industry to direct limited IR&D funds to areas with, at least theoretically, the greatest potential to produce a payoff in the form of a contract, and DOD gains insight into industry IR&D investments that can help S&T and acquisition personnel plan programs better.

Since the portal opened, more than 120 organizations have submitted more than 18,000 IR&D efforts.

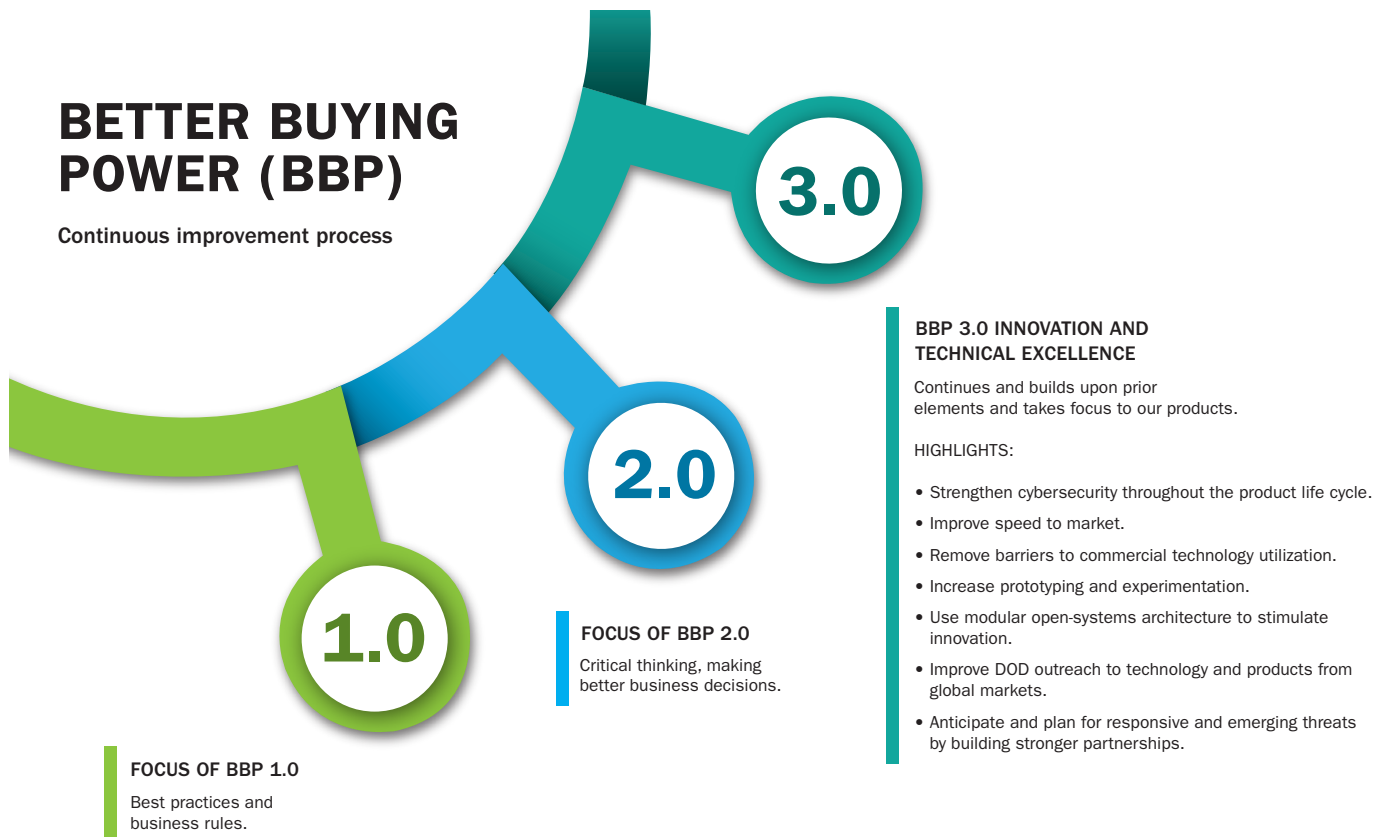
“Innovation does not only take place in Army labs,” said Dr. Thomas Russell, acting deputy assistant secretary of

the Army for research and technology (DASA(R&T)). “The Army S&T enterprise engages industry to identify potential technology solutions to Army problems and capability challenges through stronger partnerships.

“Collaboration with industry is essential to guarantee success of the Army’s most important acquisition programs,” he said. “The Army invests its limited S&T dollars in finite, Army-specific areas, while leveraging heavily innovations from industry and other partners wherever possible.”

Among the Army’s more recent undertakings to collaborate more closely with

FIGURE 4



### PUTTING BBP TO WORK

Welby believes reasserting technical dominance will require fundamental changes in DOD thinking. The many specific principles of smart acquisition that make up the BBP initiative help free resources for innovation, he said—but they don't substitute for innovation itself. (SOURCE: Office of the ASA(R&E))

academia and industry toward innovative solutions for the warfighter is the Open Campus, launched in 2014 by the U.S. Army Research Laboratory (ARL), a subordinate unit of AMC. (See “Then & Now,” Page 176.) ARL “established a business model to encourage the synergy of the university/industry/government lab triad that is critical to the discovery, innovation and transition of science and technology important to the Army,” said Russell, the director of ARL before his assignment in April as acting DASA(R&T).

At the DOD level, probably the boldest undertaking to cultivate private-sector innovators is DIUx, the Defense Innovation Unit – Experimental, a three-year pilot project that opened an outpost in Silicon Valley in summer 2015 to connect U.S. military representatives working on high-priority national security

challenges and companies operating at the cutting edge of technology. DIUx 2.0 launched in May with Carter's announcement of structural and operational improvements and plans to open an office in Boston. DOD leaders have described the overall effort as an experiment in building bridges where none had existed. In the process, the Pentagon hopes to learn how best to identify, contract and prototype novel innovations by nontraditional sources.

At the Innovation Summit, Welby also spoke of the need for large-scale military experimentation to prove innovative solutions against a backdrop of current strategy and doctrine and to see if new TTPs are necessary to make the solutions work for the warfighter.

The Army is also seeking less tangible progress toward innovation through the quarterly summits sponsored by AMC as part of the larger Army Innovation Campaign, with a concerted emphasis on unifying multiple major players behind a common vision of what the Army needs to do to foster a culture of change.

The first two summits involved Army organizations—including AMC, the U.S. Army Training and Doctrine Command, U.S. Forces Command, the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology, HQDA General Staff and the U.S. Army Corps of Engineers. “The fact that you have the agencies together at the same time, working together, I think that can kick us forward and propel us to be more effective and efficient,” said Patrick O’Neill, AMC chief technology officer.

Participation has grown from 115 attendees at the inaugural summit in November 2015 to 144 at the second summit in April. The next summit, in August, will bring industry and academia into the discussion as well, O’Neill said. “The whole idea is, [innovation] is a process that needs to start and continue ... you can just never stop. That’s why this is a campaign. It’s really pushing to do the right thing and live up to what the chief of staff has to do as far as readiness and the future Army.”

“The quarterly innovation summit program is a core component of the Army’s Innovation Campaign and an important medium for Army senior leader discussions,” said Maj. Gen. John F. Wharton, commanding general of the U.S. Army Research, Development and Engineering Command, which hosted the second summit. “This is an opportunity to build upon the knowledge and insight gained during the first summit and discover new opportunities to refine solutions that will enhance Army innovation.”

## CONCLUSION

Notwithstanding the funding, cultural, regulatory and procedural barriers to innovation, there is reason to be optimistic that the current push for innovation will produce results for the warfighter. “The appetite from senior leadership is enormous,” Welby told participants at the Innovation Summit. “We’re not innovating because it’s the cool thing. We’re innovating because it’s critical to our future.”

The question is whether the results will make a substantive difference in the United States’ technological status.

“The government needs to think about—and the person trying to sell the government needs to think about—what application

these ideas will have, if it can really make an incremental change at an affordable price,” Gansler said. That will take collaboration among the requirements, budgeting and contracting communities—as well as with industry—to think ahead. “We need to know what options we have, what are the things we could have or the things that other people are doing and how it would make any difference in defense,” he said.

The government also needs to be careful not to spread its diminished resources too thin, in Chew’s opinion. “I think that these initiatives, if they were aimed at, ‘We’re going to do this instead of that,’ then they would do something. Instead, I see a lot of, ‘We’re going to do this in addition to what [else] we’re doing.’ And that’s a problem.

“Despite all these obstacles, we haven’t been doing badly,” said Chew, who has great faith in American ingenuity. “I do believe in American exceptionalism,” he explained, and “one of our ‘exceptions’ as Americans is our ingenuity. We don’t overthink a problem. We see a problem, and we get it done. We don’t see obstacles. We see an opportunity.”

Chew sees an opportunity for DOD to take a clean-slate approach to its S&T endeavors by challenging vested interests—for example, he said, by unifying each of the services’ separate laboratory systems into one “purple,” or joint system. “Purple labs. Now that’s innovation. You know, you’d get a lot of action [with] purple labs. Not Air Force labs, or Army labs, but OSD [Office of the Secretary of Defense] labs.

“And then you need to encourage the industrial base and say, ‘Look, we really are trying to innovate.’”

*For more information on DOD S&T resources, go to <http://www.acq.osd.mil/chieftechologist/index.html>; for more on DIUx, go to <http://www.diu.x.mil>; and on the Army Innovation Campaign, <https://www.army.mil/article/151556/>.*

*MS. 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 Maj. Gen. Keith L. Ware Public Affairs Award winner, and is 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.*



## A DASH OF CRAZY

Even when organizations encourage innovation, there's no guarantee they'll recognize it when they see it. Indeed, much of the history of true innovation is also a history of mistakes, derision and what might have seemed simply crazy at the time.

Consider the ubiquitous internet. By most reliable accounts, its forerunner, ARPANET, was intended as a means for researchers to share time on expensive, large and slow computers, when computers were far from omnipresent. Based on its solution to that problem, according to the Internet History Project at [nethistory.info](http://nethistory.info), "it's reasonable to say that ARPANET failed in its purpose, but in the process it made some significant discoveries that were to result in the creation of the first internet."

An important thing to remember about the development of the internet is that before the World Wide Web, the technology that underpins it had been kicking around for close to 30 years. Few, if any, saw it as the breakthrough, enabling technology it would become.

Consider the obverse. Graphene, the only known two-dimensional material, was hailed as a substance that would change the world when the scientists who developed it won the Nobel Prize in Physics in 2010. Graphene was imbued with an aura of limitless possibility. But no one has developed it into commercial or military applications—yet.

Enabling technologies—innovations that are capable of carrying countless other innovations on their backs, and which can lead to great leaps in the states of many arts—can be difficult to recognize as such when they're developed. A Dec. 22, 2014, article about graphene in *The New Yorker* noted, "The progress of a technology from the moment of discovery to transformative product is slow and meandering; the consensus among scientists is that it takes decades, even when things go well."

We humans are creatures of habit. When we have a process that works well enough, we tend to stick with it. DOD is no different. So, when enabling technolo-

gies come along, they can seem far outside of that comfortable norm of how things are done. They can seem so trivial as not to merit interest, or ridiculous, impossible—even crazy. Indeed, much that grows out of internet technology—smartphones, online shopping, self-driving cars, instant messaging and much more—would rightly seem like magic to the casual observer of 50 years ago, even though much of the underlying technology already existed.

People tend to be blind to the inherent possibility of new things until someone does something that, to the orthodox mindset, seems crazy, a waste of time, worthy of derision—but eventually inevitable. Consider the example of aluminum cited in that *New Yorker* article. It was "discovered in minute quantities in a lab in the eighteen-twenties, was hailed as a wonder substance,



### FROM MAGIC TO COMMONPLACE

We wouldn't have smartphones without several enabling technologies: the internet, itself the result of a failed attempt to solve a different problem, and cellular technology, the result of NASA's space program. Truly disruptive technologies come from the least-expected places: from failure, from programs examining other problems (NASA wasn't trying to make it possible for us to take phone calls on the go)—and from thinkers whose ideas are usually dismissed as crazy. (Image by pixtawan/iStock)

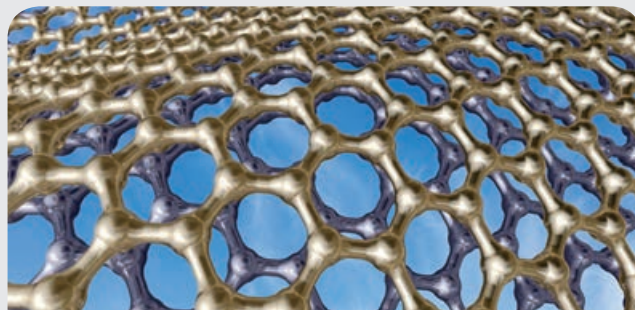


with qualities never before seen in a metal: it was lightweight, shiny, resistant to rust, and highly conductive.” Yet, as the author, John Colapinto, continues, it wasn’t until a century later that aluminum found its “killer app”—airplanes. Colapinto goes on to quote Robert Friedel, a historian of technology at the University of Maryland: “The more innovative—the more breaking-the-mold—the innovation is, the less likely we are to figure out what it is really going to be used for.”

Which makes pushing for anything but incremental innovation extremely hard. It also makes breakthrough, disruptive innovation seem to require a good dose of crazy to accomplish. And that’s a problem for DOD or anyone else trying to figure out the next big thing. Graphene has shown up in tennis racquets and ink, according to the article, but its moment of crazy transformation hasn’t happened. It may never.

Historically, it has often been the case that technologies intended to solve a particular problem have been found to do a very good job solving entirely different problems. Aluminum was discovered a very long time before the first airplane ever made it off the ground. ARPANET “failed” to solve the problem for which it was invented, but it solved a whole lot of problems that no one had ever imagined needed solving.

That’s because, sometimes, enabling technologies depend on other enabling technologies to find their true utility. Many of the technologies we associate with one war were invented in a previous one. Trenches were developed during the Civil War when advances in weapons technology had not been matched by advances in technologies to enhance mobility. That eventual advance in ground mobility, the tank, was developed during World War I, but not as a mobility solution. Tanks were intended to solve the problem of barbed wire on the battlefield. And while they were a smashing success at that, their continued development—despite much resistance—enabled significant advances in the art of warfare. The jet engine had been around in basic form for centuries before, late in World War II, a practical design for a jet-powered airplane was developed, but too late to have much impact in that war. Technologies that are common on today’s



#### A GAME-CHANGER IN WAITING?

The idea of graphene, shown here at the molecular level, has been around for many decades, but it wasn’t actually produced until the last decade. And despite its seemingly game-changing properties—superb electrical and thermal conductivity, strength 100 times that of steel of similar size, near-transparency—graphene has yet to “change the game” six years after the Nobel Committee recognized its groundbreaking nature. Innovation can require decades or centuries of waiting for other technologies to catch up, or for the right problem to present itself. (Image by Martin McCarthy/iStock)

battlefields were developed during and after the Cold War, when they would have seemed crazy.

Because of the situation in which the Pentagon finds itself today, it may be time to “open the aperture” not just to thinking outside the box, but to thinking just a little crazy, which will take a considerable cultural shift. It helps to remember that quote from the technology historian. “The more innovative—the more breaking-the-mold—the innovation is, the less likely we are to figure out what it is really going to be used for.”

It’s entirely possible, even likely, that the enabling technologies for the next big things are right under our noses—already in some drawer, on some shelf, in someone’s garage. It’s just that no one has figured out the crazy part yet. That will happen when someone comes along who knows nothing of what the technology is “supposed to do” but figures out what it can do or ought to do. Suddenly, there will be a breakthrough.

Then, instead of calling it crazy, we’ll all decide that it was inevitable.

—MR. STEVE STARK

# On the + SIDE

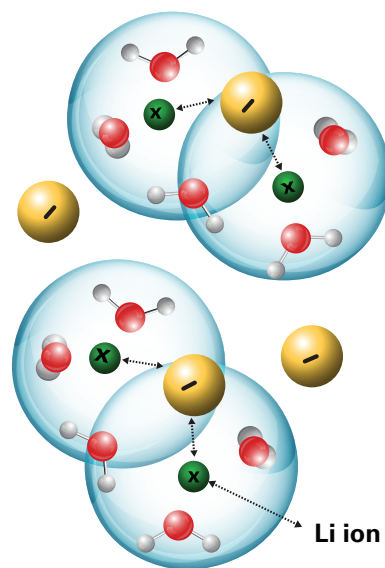
Lithium-ion batteries pack a lot of energy but can catch fire or explode. Scientists at the Army Research Laboratory have found something that can stabilize them: water in salt.

*by Dr. Arthur von Wald Cresce*

*A lot of very smart people work in Army acquisition—scientists, technicians, engineers—and many are the best in the world at what they do. That work is often mind-bogglingly complex, given the nature of the systems that they help to design, develop and deliver for the benefit of the Soldier. They often speak in technical language that people outside their area of expertise just wouldn't understand. But it's important that taxpayers and members of Congress and their staffs understand it—not just because taxpayers have a need and a right to know, but also because it's really hard to have a conversation when only one party speaks the language.*

*So it's a helpful exercise to step back from the highly particular language and jargon of a technical field and try to express those highly technical ideas in language that everyone can understand. "Technically Speaking," a regular feature in Army AL&T magazine, challenges subject matter experts to do just that, using the plainest language possible.*

*For this issue, Army AL&T reached out to Dr. Arthur von Wald Cresce. He's a seven-year veteran of the Electrochemistry Branch of the U.S. Army Research Laboratory (ARL) in Adelphi, Maryland. He works on making batteries lighter, more powerful and safer. He was recently an author of a paper based on the study of "water-in-salt" lithium-ion battery technology that was published in the peer-reviewed scientific journal *Angewandte Chemie*. Here, he explains the tremendous impact that a new battery technology could have for the Army and for civilians alike.*



## **Li (H<sub>2</sub>O)<sub>2.5</sub>-TFSI** **Water-in-Salt**

### **A WISE CHOICE**

Batteries using WiSE are safer and can eliminate the heavy, complicated packs Soldiers have to carry that have built-in fire protection and temperature control. (Images courtesy of ARL)



Look in almost anything that's electronic but doesn't need a plug to run, and you will find a rechargeable lithium battery providing the energy. There are alternatives, sure. But instead of being a few ounces, your smartphone would weigh a few pounds. So far, lithium-ion batteries are the very best way we know of to cram the most energy into a small, fixed space. No other type of battery can hold as much energy as lithium-ion. But if you've ever seen a video of a hoverboard going up in smoke, the probable cause is the battery. Lithium-ion batteries can be dangerous when not used properly. But scientists at the ARL are getting WiSE and trying to change that. WiSE stands for water-in-salt-electrolyte, but more about that later.

To put batteries in perspective, you have to look at the amount of energy (watt-hours, or the amount of energy the battery stores) and the weight of the battery (in this case, kilograms). The kind of battery in most cars, lead-acid, offers about 50 watt-hours per kilogram. Nickel metal-hydride is a little better at 120 watt-hours per kilogram. But lithium-ion is the undisputed leader of rechargeable batteries, soaring to 200 watt-hours per kilogram with the potential to reach as many as 350.

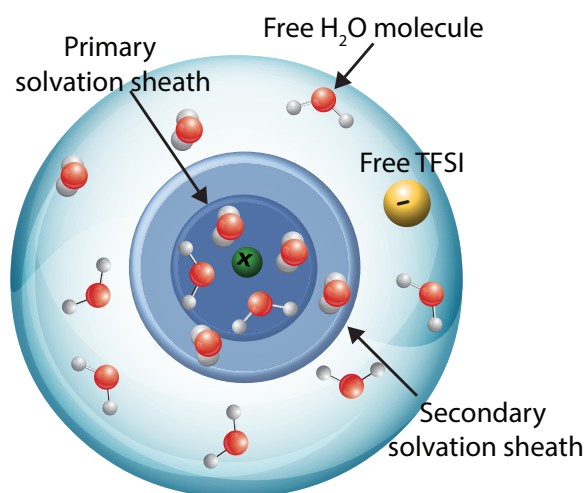
It is because of their high energy density that Soldiers carry lithium-ion batteries into the field. And for a good reason—lithium-ion batteries' huge energy advantage leaves room for ammunition and extra equipment. As important as batteries are for civilians, they're even more so for Soldiers. And they're rapidly approaching the point where they have the potential to power hybrid and electric vehicles on the battlefield.

### INSIDE A BATTERY

Modern lithium-ion batteries have three main parts. First is the anode, which is made of something like pencil lead. Second is the cathode, which is typically a metal oxide. In between anode and cathode is a special liquid: the electrolyte. The electrolyte is a solution of lithium salt in a liquid solvent, and it allows the flow of lithium ions back and forth between the anode and cathode as the battery is used and recharged.

Lithium batteries that are given hefty tasks, like powering an electric car, can overheat. Battery fires are fueled by the electrolyte, which is readily flammable. Battery fires are particularly dangerous because the burning electrolyte releases toxic fumes, and the fire can't be extinguished with water.

That's because if you throw lithium metal into water, it reacts violently to form lithium hydroxide. Worse, throw that lithium



## Salt-in-Water

### BIG BOOM

When used in a battery, a normal water electrolyte could explode above 1.5 volts because of the generation of hydrogen and oxygen gas. As a result, most lithium-ion batteries are engineered to use only a fraction of their maximum potential energy.

salt from the electrolyte into water and it forms hydrofluoric acid, which can dissolve glass and decalcify bone.

The danger of lithium-ion battery fires sparked a need within the industry to engineer protective packs that regulate temperature and manage the health of the battery. As an extra precaution, most lithium-ion batteries are engineered to use only a fraction of their maximum potential energy to minimize the stress—and risk of fire.

### CRACKING WISE

Researchers want to change the model and allow the lithium-ion battery to use its full capacity. The unlikely hero of that effort? Water.

Not all lithium salts react so dangerously with water. There is one that forms no such spontaneous reaction. In fact, dissolving it in water is entirely safe. Remarkably, it is possible to dissolve 6 kilograms of this special lithium salt (called LiTFSI) in one kilogram of water. That's roughly the equivalent of dissolving two-thirds of a pound of common table salt in one cup of water.



### THOUSANDS OF USES

The high energy density of lithium-ion batteries makes them a good choice to carry on the battlefield, and they could soon be able to power hybrid and electric vehicles. (Photos courtesy of ARL)



### STABILITY ISSUES

Lithium-ion batteries are great at storing electricity, but the instability of the batteries' chemistry leads to safety concerns. Technological advances to eliminate safety issues could also expand use of the battery to vehicles and power grids.

It is the super-solubility of LiTFSI that makes water a potential lithium-ion battery electrolyte. The name we have given this water-based electrolyte is WiSE—water-in-salt electrolyte. We've had saltwater forever, but watersalt is something far less common.

With such a high concentration of LiTFSI in water, two interesting things happen. First, water becomes less likely to interact with the electrodes. Secondly, fluorine atoms in WiSE—the “F”

in LiTFSI—form a protective barrier layer on the surface of the anode, not unlike the way fluoride in toothpaste coats teeth.

With the anode shielded by the barrier layer, the electrolyte does not decompose, allowing WiSE-based batteries to leap beyond the 1.5-volt limit of water-based batteries like alkaline, lead and nickel metal-hydride. ARL's WiSE batteries operate at 2.5 volts, and 3-volt versions are currently being tested.

WiSE is also very safe: It does not burn and contains no potentially toxic salt. Batteries using ARL's WiSE will not require heavy and complicated battery packs for fire protection and temperature control, which means more battery and less pack.

### CONCLUSION

Exciting possibilities are opening up in the lithium-ion battery world that could improve the battery experience for Soldiers and civilians alike. Today's lithium-ion batteries are not stable enough to operate as a large-scale grid storage system, but WiSE just might. Electrical microgrids—like small, very local electric companies—that would manage energy produced by, for example, solar power, could lean on a WiSE-based battery bank to store and release electricity. Electric vehicles could bypass concerns of battery-based fires and take full advantage of the reliability and huge torque of electric motors.

While lithium-ion batteries power our mobile lives, they have not proven safe and durable enough to store huge amounts of electrical grid energy or to even start our cars. But one day that will change. That could be soon, and your next car could be powered by a WiSE lithium battery that you read about right here.

*For more information about water-in-salt, go to <http://online.library.wiley.com/doi/10.1002/anie.201602397/full>. For more information about the U.S. Army Research Laboratory, go to [www.arl.army.mil](http://www.arl.army.mil).*

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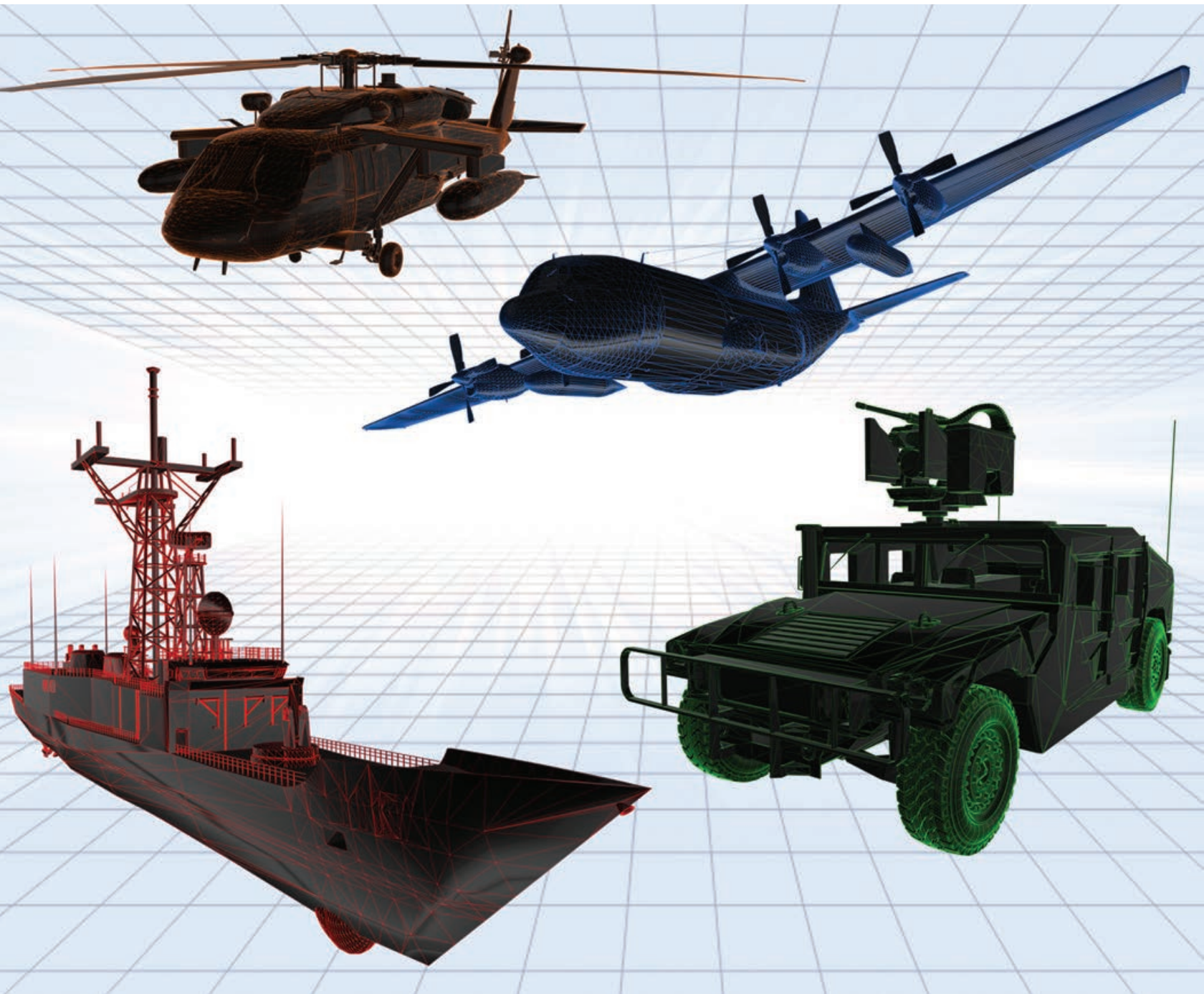
*DR. ARTHUR VON WALD CRESCE holds a Ph.D. and a B.S. in materials science from the University of Maryland, College Park. He is a seven-year veteran of the Electrochemistry Branch of ARL. He was an author on a peer-reviewed paper based on the study of “water-in-salt” lithium-ion battery technology that was published in April in the journal *Angewandte Chemie*.*



# EMPOWERING INFORMATION DOMINANCE

Acquisition Business • Acquisition, Logistics & Technology Enterprise Systems & Services • Army Contract Writing System • Army Enterprise Systems Integration Program • Army Human Resource Systems • Automated Movement & Identification Solutions • Computer Hardware, Enterprise Software & Solutions • Defense Communications & Army Transmission Systems • Defense-Wide Transmission Systems • Distributed Learning System • Enterprise Computing • Enterprise Content Collaboration & Messaging • Enterprise Services • Force Management System • General Fund Enterprise Business System • General Fund Enterprise Business System Increment 2 • General Fund Enterprise Business System – Sensitive Activities • Global Combat Support System – Army • Human Resource Solutions • Installation Information Infrastructure – Communications & Capabilities • Installation Information Infrastructure Modernization Program • Integrated Personnel & Pay System – Army • Integrated Personnel & Pay System – Army Increment 2 • Land Mobile Radio • Logistics Information Systems • Logistics Modernization Program • Medical Communications for Combat Casualty Care • Power Projection Enablers • Reserve Component Automation Systems • Security Cooperation Enterprise Solution • Wideband Enterprise Satellite Systems





### MODELING SUCCESS

With ERS, design alternatives and system capability trade-offs for a range of platforms—including ships, fixed-wing aircraft, rotorcraft and ground vehicles—can be generated in much shorter time frames and produce an array of options that's larger and more accurate than those created with traditional methods. (Image by Brandon Pittman, ERDC)

# A *Million* More OPTIONS *for* Your Next PURCHASE

The Engineered Resilient Systems program harnesses high-powered computing and modeling and simulation to produce many, many more designs for aircraft, ships and ground vehicles. The upshot? Acquisition professionals can consider a much broader and more accurate range of options.

*by Dr. Owen Eslinger and Ms. Megan Holland*

DOD is leveraging years of science and technology (S&T) investment to transform acquisition processes through the Engineered Resilient Systems (ERS) program. By enabling more detailed engineering analyses, ERS significantly increases the number of design options examined early in the acquisition process in equal or less time than traditional methods. The program and its associated community of interest are developing concepts, techniques and tools that significantly sharpen requirements before major acquisition milestones and more effectively support prototyping and experimentation.

Enhancing requirements before beginning major decision points gives leaders vital data needed to make better-informed decisions and support more precise analyses of alternatives. With ERS, DOD is buying down the risk of future systems by using high-fidelity modeling and advanced analyses of design options, as well as linking candidate platforms to traditional modeling and simulation toolkits and employing





#### HUDDLE UP

Paratroopers from the 173rd Airborne Brigade prepare to board a CH-47 Chinook helicopter for a September 2015 airborne operation in Pordenone, Italy. The U.S. Army Aviation and Missile Research, Development and Engineering Center's Aviation and Engineering Directorate used ERS to streamline a software program used to respond to airworthiness calls related to the Chinook and other rotorcraft, and the program can now be combined with simulated flight data to model mission performance. (U.S. Army photo by Spc. Paolo Bovo)

DOD's high-performance computing assets. Design alternatives and system capability trade-offs now can be generated in hours rather than months, producing an index of options that is thousands of times larger and hundreds of times more accurate than those created with traditional methods.

The work being done through the ERS program spans all services and has aided in analyses of fixed-wing planes, rotorcraft, ground vehicles and ships. The ultimate goal is to build combat systems that are responsive to increasingly complex and dynamic missions but still within current and future budget constraints. Better understanding of design parameters and trade-offs can produce weapon systems that are more capable. Designs also need to be resilient—systems should be easy to modify to meet future mission goals and possess a predictable life cycle. The need for a DODwide approach that could meet those challenges

while providing a standardized method for analyzing new systems or adapting existing ones was the motivating factor behind the ERS program.

#### SUPPORTING SHARED PRIORITIES

The idea for ERS first took root in 2010, when Dr. Zachary J. Lemnios, assistant secretary of defense for research and engineering, briefed Congress on top science and technology needs. By 2011, a priority steering committee was convened by Dr. Robert T. Neches, director of advanced engineering initiatives in the Office of the Deputy Assistant Secretary of Defense for Systems Engineering, to establish theoretical foundations.

In 2013, ERS transitioned from a steering committee to one of Reliance 21's 17 communities of interest. Reliance 21 is DOD's overarching framework for the S&T joint planning



and coordination process. It provides solutions and advice to senior decision-makers, warfighters, Congress and other stakeholders through information sharing, alignment of effort and coordination of priorities. The communities of interest provide a forum for coordinating S&T strategies across DOD, sharing technology opportunities, jointly planning programs and measuring technical progress.

The ERS community of interest steering group selected Dr. Jeffery Holland, director of research and development and chief scientist for the U.S. Army Corps of Engineers as well as director of its Engineer Research and Development Center (ERDC), as lead in March 2013. The ERS program, developed in 2013 and headquartered at ERDC, likewise has the mission of coalescing the community around a common approach and techniques.

Putting theory into practice, Holland rapidly engaged military research organizations and conducted targeted demonstrations across multiple platforms. The early days focused on understanding existing ERS-related technology, and program leaders worked to facilitate knowledge sharing among subject matter experts across the services and the country. Now, some five years later, ERS is the glue for its more than 60 stakeholders and partners across DOD, industry and academia.

### THE ERS APPROACH

At the outset of the ERS program, researchers from ERDC, the Air Force Life Cycle Management Center and the Carderock Division of the Naval Surface Warfare Center focused on the conceptual design phase. This proved to be fertile ground for the ERS approach, thanks to those within the acquisition

community who understood the benefits of transitioning from point-based design to set-based design. Point-based methods begin with an existing design, which is then revised one component at a time (for example, engine size) until a design is established that meets all criteria. The traditional technique, which depends on both the project team and the quality of the initial design, is considered by acquisition experts to be workable rather than optimal.

By contrast, set-based design combines requirements to produce a list of design possibilities that is all-encompassing. The method allows the generation of millions or even billions of designs, often referred to as a tradespace. By vastly increasing the number of designs considered, analysts have the input and tools needed to properly examine and rank alternatives.

Though the benefits of transitioning to set-based design are clear, software used for the approach lacked maturity, and an updated multidisciplinary approach was necessary to integrate numerous codes. Working through additional problems such as limited network access and a shortage of support tools, ERS program leaders set out to remedy concerns and help users analyze a greater volume of design options. Using both government and commercial off-the-shelf software, ERS released its first suite of products in 2014. Known as TradeStudio, the suite

allows users to define the design space, set element parameters, optimize output for creating tradespace, and analyze, narrow and select designs.

The combination of advanced physics-based modeling and tradespace analyses offers more insight than ever into alternative decision paths. It allows for the comparison of designs using accurate digital representations of environmental conditions and then the assessment of integration with various wargaming simulations. With a variety of tools available, users can customize analyses to resolve individual needs and concerns. The process is coupled with a single open-source architecture that allows industry and academia to connect, and a computing infrastructure that includes multiple support environments. High-performance computing sustains the process from beginning to end.

### EXPONENTIAL ADVANTAGE

The ERS program assisted the Naval Sea Systems Command in 2013 as it analyzed options for a new class of amphibious transport dock warships, the LX(R). Designing a new class of ship, a complex and lengthy task, historically included the examination of five to 20 potential solutions. Using ERS methods, researchers evaluated more than 22,000 concept designs in just three months, a time frame previously unheard of. Based on the success of the project, ERS researchers again

*Design alternatives and system capability trade-offs now can be generated in hours rather than months.*



### UNMANNED CAPABILITY

The Logistics Vehicle System (LVS) is a modular assortment of eight-wheel-drive, all-terrain vehicles used by the Marine Corps. Fielded in 1985 and manufactured by the Oshkosh Corp., the LVS is part of an ERS-aided effort to field unmanned military ground vehicles, a capability that will improve mission capability and Soldier safety. (Photo courtesy of Oshkosh Defense)

partnered with the Navy in 2014 to analyze designs for a potential new class of small surface combatant (SSC) ships. The use of set-based design transformed the SSC study. Researchers were able to produce and visualize 3.6 million designs incorporating 212 variables in only 27 minutes, versus the point-based results of 7,000 designs incorporating 16 variables in three weeks.

The Air Force applied ERS methods in 2013 to a notional cargo plane project, part of a transition to the use of effectiveness-based metrics for conceptual design. Historically, engineers first calculated performance tradespaces and then delivered point designs to cost estimators and effectiveness analysts. With time and funding restrictions, it was rarely possible to complete more than one or two analysis iterations. The strategy created a gap in information for acquisition professionals, who needed to know more about effectiveness and costs earlier in the process. ERS methods successfully united performance, effectiveness and cost data within a single design tradespace, setting the standard for future conceptual design efforts.

The ERS team also worked with the U.S. Army Aviation and Missile Research, Development and Engineering Center's Aviation and Engineering Directorate in 2015 to streamline HELOP, a software program used to answer more than 2,000 rotorcraft airworthiness and analysis-of-alternatives calls per year. The update permits simultaneous completion of thousands of parallel runs, allowing HELOP to be combined with simulated flight data to produce predictive mission performance data for cargo platforms. This will be especially useful as the Army looks toward the next generation of rotorcraft.

While ERS aided these efforts, in return each provided invaluable developmental input for ERS program leaders, who used these real-world projects to evaluate the effectiveness of tools and techniques, organize workflows and validate methods. Additionally, capabilities expanded with every new venture. Analyses not only grew in size, they also grew in richness. Reusable data and increased functionality add depth, resulting in improved processes over time.





#### READY FOR REPLACEMENT

The Oliver Hazard Perry-class fast frigate USS Ford departs Joint Base Pearl Harbor-Hickam, Hawaii, to support Rim of the Pacific exercises. The Ford was decommissioned in 2013, and the Naval Sea Systems Command used ERS modeling tools to identify a suitable replacement in just three months. (U.S. Navy photo by Petty Officer 1st Class Jason Swink)

#### CONCLUSION

Though the ERS program has found its footing, challenges remain. Progress has been made in programmatically linking models that aren't executed locally, but there are hurdles to distributing models that use a variety of assets and involve multiple classification levels. The ability to create large amounts of data is not a solution if the problem instead becomes how to handle that increased amount of data. Additional obstacles include intellectual property concerns, finding a way to use third-party vendors to help with connectivity issues, and addressing the need for long-term data storage.

The program has had success within DOD, but the true vision remains to develop connections with industry whenever possible. Leaders are leveraging formal relationships with major defense contractors and working together toward an ERS-enabled future. These partners are providing software tools and techniques that enrich trade studies using a set-based approach. Ultimately, both sides will benefit from empowering DOD to

improve the way requirements are set and field resulting systems as quickly as possible.

*For more information, contact Megan Holland at [megan.m.holland@erdc.dren.mil](mailto:megan.m.holland@erdc.dren.mil).*

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## CHECKING PROGRESS

A technician monitors material growth in a molecular beam epitaxy reactor, the start of the process for making the infrared focal plane arrays developed through VISTA. (Photo by Dr. Amy W.K. Liu, IQE PLC)



# BREAKING BARRIERS to COLLABORATION

A model called 'horizontal integration using trusted entities' is helping the VISTA program develop and mature new component technologies, establish a completely new industrial base and have the technology ready for transition in just five years.

*by Ms. Leslie Aitcheson and Mr. Nathan Burkholder*

**Y**ears ago, if the Army wanted to develop complex, ambitious capabilities with industry, it relied on a strategy of vertical integration, in which a single defense contractor controlled the various stages of production, such as research and development, supply and distribution. Vertical integration occurred on a large scale over the last two decades as consolidation and mergers of major defense contractors created almost monopolistic industry entities.

As time has passed, DOD has been forced to re-examine this dependence on vertical integration. Such strategies often resulted in systems that depended on government funding to remain viable and ended when the funding dried up. Additionally, according to the Defense Business Board and DOD

leaders, such strategies are a barrier to new entrants to an industrial base, and the lack of independent system integrators creates barriers to innovation. How does the Army develop an integration strategy that not only fosters collaboration, competition, communication and innovation, but also results in capabilities that can sustain themselves through nongovernmental means?

Answers to these questions can be found in the pioneering work of a tri-service program called Vital Infrared Sensor Technology Acceleration (VISTA), led by the Night Vision and Electronic Sensors Directorate (NVESD) of the U.S. Army Communications-Electronics Research, Development and Engineering Center (CERDEC), which is a subordinate element of the U.S. Army Materiel Command.



### THE VISTA ADVANTAGE

In the VISTA program, scientists developed a new class of materials for a critical component of an infrared camera sensor: infrared focal plane arrays. Analogous to your eye's retina, the infrared focal plane array detects and absorbs the infrared signature. Historically, infrared focal plane arrays for advanced systems have been costly and hard to produce and have relied on components from other countries. Additionally, advanced infrared focal plane arrays require cooling to low temperatures, which can lead to higher size, weight and power (SWAP) demands and shorter life spans.

III-V antimony-based infrared focal plane arrays address these issues. When we say "III-V," we are referring to the material elements in columns III and V of the periodic table. Improvements in manufacturing technologies to grow thin film crystals in the 1990s have enabled better control of the material's electrical properties, allowing engineers to grow layers of these III-V elements on gallium antimonide substrates. Fabricators then etch, dice and hybridize multiple detectors from each substrate to make focal plane arrays.

III-V strained layer superlattice (SLS) infrared focal plane arrays can theoretically provide better performance than traditional II-VI technology at a much lower cost. Additionally, III-V SLS offers many of the benefits that DOD is seeking, such as SWAP and yield, because it can operate at higher temperatures for some applications. It can also be made repeatedly with extremely high operability and uniformity, and all of its components are made in the United States.

—CERDEC NVESD

VISTA set out to do what many thought was impossible: challenge industry and DOD to develop and mature new sensor component technologies, establish a completely new industrial base and have the technology ready for transition in just five years. All of that represents a considerable challenge, given that precursor sensor development efforts took more than 50 years to reach their current capability.

### CHANGING FOCUS

To overcome these obstacles and embrace the challenge, DOD engineers and scientists had to develop an entirely new model for engaging with industry that used horizontal integration rather than

vertical stovepipes and leveraged trusted entities to share intellectual capital, while preserving the integrity of a competitive environment.

It's a model that could bring participants together cooperatively to work on a challenge of national importance. Dr. Meimei Tidrow, VISTA program manager and chief scientist for focal plane arrays at NVESD, explained, "We needed an innovative model. We needed stakeholders with buy-in power and scientists with world-class talent. And even more difficult, we needed industry players that were willing to work together, even if they were competitors."

Thus, VISTA pioneered a new strategy model—horizontal integration using trusted entities (HIUTE)—with these key components:

- Engage the user community.
- Use trusted entities to share breakthroughs between competitors.
- Facilitate industrial buy-in.

The warfighter is an invaluable component in the horizontal integration model, providing feedback while understanding and accepting that it may take several attempts to overcome hard technical challenges.

"We knew the first order of business for VISTA was to get buy-in and direction from the broadest user community in DOD," said Dr. Donald Reago, NVESD director. "So we established a stakeholders review board that set goals at the onset of the program and then re-evaluated progress and goals on an annual basis. By doing so, we knew we had the user community's interest at the forefront, and we stayed on top of changes as VISTA progressed."

VISTA's stakeholder review board included senior members of the Army, the Air Force, the Navy, the Missile Defense Agency, the Defense Advanced Research Projects Agency and the National Reconnaissance Organization.

### LEVERAGING NEW PLAYERS

The trusted entities in the horizontal integration model are leading researchers in DOD—the scientists who perform important research and development that leads to breakthroughs. For VISTA, these scientists came from NVESD, the Jet Propulsion Laboratory (JPL), the U.S. Naval Research Laboratory and the Massachusetts Institute of Technology's Lincoln Laboratory.





### DEVELOPING NEW TIES

Dr. Jerry McGinn, left, principal deputy director of the Office of Manufacturing and Industrial Base Policy in the Office of the Undersecretary of Defense for Acquisition, Technology and Logistics, discusses technology capabilities with an attendee of a VISTA showcase, held April 12-13 at Fort Belvoir, Virginia. (Photo by Kay Stephens, CERDEC NVESD)

In the VISTA program, which ran from FY11 through FY15, these trusted entities developed a new class of materials for infrared focal plane arrays and digital readout integrated circuits, then transferred their designs and findings to industry. (See "The VISTA Advantage" for more information on focal plane arrays.) Commercial foundries such as IQE PLC and Intelligent Epitaxy Technology Inc. used these VISTA-inspired recipes to grow wafers, thin slices of semiconductor material, which are then sent to fabrication houses. The fabrication houses finalize the process by converting the wafers into functional focal plane arrays, which are then tested and demonstrated. Fabrication houses participating in VISTA included HRL Laboratories LLC, L-3 Cincinnati Electronics, Lockheed Martin Santa

Barbara Focalplane, Raytheon Vision Systems and Teledyne Scientific & Imaging.

The use of commercial foundries is significant in that it engaged manufacturers that are not reliant on DOD for their survival and sell cellphone chips and other electronic components as their primary revenue streams. "The integration of commercial foundries through the HIUTE model was incredibly important to our long-term success," said Andy Davis of the U.S. Army Manufacturing Technology program, better known as ManTech. "The use of trusted entities enabled us to provide critical designs and know-how necessary to establish the production capabilities within the manufacturing community."

A key feature in how the VISTA program executed horizontal sharing among competitors was the quarterly program review, where all participants and stakeholders reviewed progress and discussed possible solutions to technical issues. Seventeen quarterly program reviews have been conducted over the past five years, with government stakeholders, trusted entities and industry partners sharing key findings in two-day meetings.

"This sharing was unprecedented," said Dr. A. Fenner Milton, former NVESD director. "It's very unusual to see competitors sit side by side in a room and share results with each other. Without these discussions, it would be difficult to have this much progress over such short a time."

*This model provides the government with opportunities to leverage investments from other sources and reduce costs while increasing the self-sufficiency of the industrial base.*



### READY FOR A CLOSE-UP

One of the items exhibited at the VISTA showcase was this camera. With support from the Office of the Secretary of Defense, the U.S. Army ManTech program and the Missile Defense Agency, and in partnership with industry and government laboratories, VISTA has enabled the development of lower-cost technologies, and a new industrial base has been established. (Photo by Kay Stephens, CERDEC NVESD)

### FACILITATING INDUSTRY'S BUY-IN

To further facilitate industrial buy-in, VISTA established an industry consortium to identify and address common problems. Led by NVESD and JPL, a VISTA-participating federally funded research and development center, the consortium is completely funded by eight industry members through a five-year agreement. Industry participants combine resources, pay JPL to do work, and receive and share rights to use the intellectual property for government purposes up to production and for proposals. "We [the government] recognized the challenges industrial competitors would face in having cooperative discussions," said Reago. "In the case of VISTA, NVESD served in a pivotal role as the consortium committee chairperson in facilitating constructive dialogue and providing oversight and guidance to this process."

Over the course of the five-year program, the VISTA consortium's eight industry members included BAE Systems, DRS Technologies, HRL Laboratories, FLIR Systems, L-3 Cincinnati Electronics, Lockheed Martin, Raytheon Vision Systems and Teledyne Scientific & Imaging.

VISTA has provided tremendous results over a short period of time, with unparalleled sensor technology that exceeds most adversaries. "We've done a lot, but there is more work to do," said Tidrow. "And, if we continue, we will definitely be using the HIUTE model. HIUTE clearly reduced the time for development and industry establishment, while also allowing the entire national team of participants to learn about breakthroughs and approaches that didn't pan out, saving us a lot of time and effort. We would never have been where we are today using a historical vertical solution with only one commercial provider."

### CONCLUSION

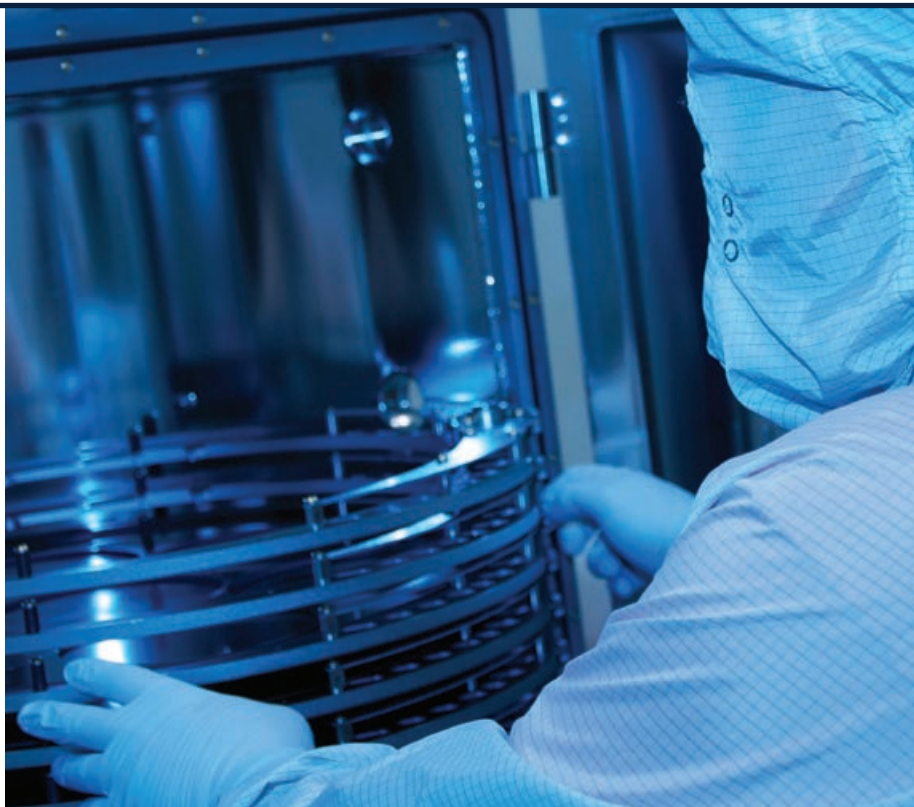
The horizontal integration model was successful in addressing many of the challenges that the science and technology community faces when tackling hard problems with high risks. The model illustrates how industry can connect with the brightest minds in a collaborative manner that shares lessons learned while preserving the competitive spirit that motivates organizations and individuals to innovate.

This model provides the government with opportunities to leverage investments from other sources and reduce costs while increasing the self-sufficiency of the industrial base. It also redefines how industry can work not only with the government, but also more collaboratively with all of its members. It's enabling DOD to push the boundaries of conventional thinking regarding the limitations of science.

It is through the HIUTE model that VISTA has become a success for DOD and industry. The technology developed

*The use of commercial foundries is significant in that it engaged manufacturers that are not reliant on DOD for their survival and sell cellphone chips and other electronic components as their primary revenue streams.*





### LAYERS AND LAYERS

This platen is used for creating multiwafer substrates. Multiple substrates are then combined to make infrared focal plane arrays, which provide better performance than traditional technology at a much lower cost. (Photo by Dr. Amy W.K. Liu, IQE PLC)



### WHAT THE FUTURE LOOKS LIKE

Dr. Sumith Bandara from the CERDEC NVESD Science and Technology Division describes the advantages of VISTA technology in mitigating degraded visual environments during a demonstration of a sensor in brownout conditions at the April VISTA showcase. (Photo by Kay Stephens, CERDEC NVESD)

in this program will be transitioned to multiple programs of record, including third-generation forward-looking infrared capabilities, the Apache Project Management Office, Javelin upgrade and Joint Strike Fighter, and ultimately facilitate warfighter overmatch in any environment. Additionally, the successful implementation of the model has significantly reduced critical dependence on foreign technologies, encouraged U.S. industrial competition and allowed industry to focus on its strengths.

Using the model, DOD boosted the number and capabilities of infrared sensor-related domestic suppliers, making the United States more competitive in this critical technology area. Products delivered from this effort will enable the next generation of sensors to perform at the levels necessary for our Soldiers to maintain overmatch in the years to come.

*For more information on VISTA or the horizontal integration model, contact Dr. Meimei Tidrow at [meimei.z.tidrow.civ@mail.mil](mailto:meimei.z.tidrow.civ@mail.mil).*

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### CLOSING THE 12,000-MILE GAP

GPS satellite receivers like the one used by this Soldier are vulnerable to conditions that impede the signal transmission. The chip-scale atomic clock provides the Soldier a backup source of accurate time and a quicker recovery when the GPS signal is restored. (U.S. Army photo)



# It's About TIME —All of It

When GPS goes out, the chip-scale atomic clock may be coming to the rescue.

*by Mr. John Delcolliano and Mr. Paul Olson*

**A**ccurate time is crucial to our military. It enables all the warfighting functions of an expeditionary force: radio communications, network synchronization, information gathering, weapon systems, manned and unmanned systems, maneuvers, fires, electronic warfare and all types of sensors.

In addition to relying on the positioning capabilities of the Global Positioning System (GPS), many Army systems use GPS, which was developed by the U.S. military, for its highly accurate time. That's because if you know where you were 10 seconds ago, you can determine where you are now based on very sophisticated calculations.

Timing is everything. GPS satellites, which have atomic clocks on board, send out signals at precisely timed intervals. On Earth, a GPS receiver calculates exactly how long it took to get the signal from the satellite to the ground. One measurement enables the receiver to determine the precise time of day, and three more triangulate the position of the GPS receiver on Earth.

However, more than 12,000 miles separate the Earth from the GPS satellites, leading to a fragile signal by the time it reaches the receiver. This makes GPS unreliable in some environments, such as dense forests or urban areas

with large skyscrapers, and vulnerable to jamming from enemies. Today GPS receivers use ordinary quartz clocks. During signal drop-outs, the clock drifts during short intervals, making reacquisition of the signal difficult. If a receiver had an additional source of accurate time—such as its own atomic clock—that would allow for easier and quicker GPS recovery.

## **VERY ACCURATE, VERY BIG**

Atomic clocks are recognized for their accuracy. But the typical atomic clock is rack-mounted, weighs 50 to 60 pounds and requires lots of power. They're great for fixed-base tactical operation centers and large platforms such as ground and air vehicles, but not for dismounted Soldiers.

At the U.S. Army Communications-Electronics Research, Development and Engineering Center (CERDEC), the Positioning, Navigation and Timing (PNT) Division strives to enable true navigation, timing and total situational understanding for the dismounted Soldier and commander in varying conditions, including degraded or GPS-challenged or -denied environments. The division is part of the Command, Power and Integration Directorate (CP&ID) of CERDEC, home to the Army's experts for Soldier and manned-unmanned ground platforms.



The CP&ID drives PNT innovation so that Soldiers will have an optimal solution regardless of the circumstances they might encounter; these innovations span the areas of identifying potential threats, anticipating future needs and making science and technology investments that will help the Soldier beyond 2025.

### SEEKING ATOMIC CLOCK CAPABILITIES

In 2002, the National Institute of Standards and Technology demonstrated a rudimentary physics package that proved the feasibility of a miniature-scale atomic clock. CERDEC and the Defense Advanced Research Projects Agency (DARPA) set out to mature this proof of concept and provide complete atomic clock capabilities for weapons, weapon systems and the dismounted Soldier.

This collaboration resulted in the chip-scale atomic clock (CSAC), a microchip-sized prototype that would support highly accurate location and battlefield situational awareness, even in the temporary absence of GPS.

CSAC is one of the most game-changing PNT technologies developed in a long time, and DOD has just begun to scratch the surface of its potential. CSAC enables a device to hold accurate time at sub-microseconds for hours after losing access to GPS. At 15 cubic centimeters, about the size of two books of matches, CSAC can be integrated into a platform, weapon or handheld device while being transparent to the user.

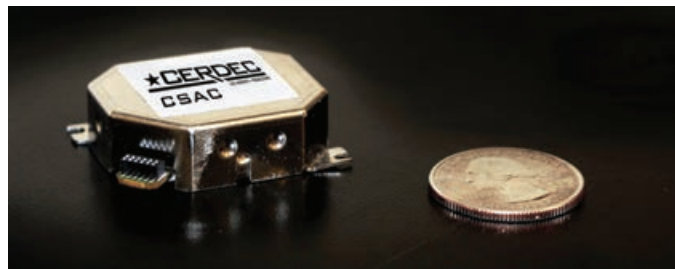
While CSAC's precision is not that of a full-scale atomic clock, which is accurate to about a nanosecond or less, its accuracy is acceptable, making it a trusted source of time with advantages in size, weight and power. If GPS is degraded or disrupted, a CSAC could provide precise time to the GPS receiver to enable rapid recovery.

Such a device is considered game-changing because CSAC provides 100 to 1,000 times better accuracy than clocks of the same size and format, enabling new capabilities in radios, GPS receivers and other military electronics. But it was saddled initially with labor-intensive manufacturing processes that produce small quantities at high cost. CSAC was highly impractical at \$8,700 per item, and the manufacturing capability was enough to turn out just tens of devices a month in a laboratory environment. These manufacturing challenges had to be addressed to ensure consistent, repeatable quality at a lower cost per unit.



### WHICH WOULD YOU RATHER CARRY?

Full-scale atomic clocks are the most accurate, telling time to the nanosecond, but they weigh 50 pounds or more, not including the weight of the power supply. At a very portable 15 cubic centimeters, the chip-scale clock tells time in microseconds or better. A microsecond is one-millionth of a second; a nanosecond is one-billionth of a second. (Photos by U.S. Army CERDEC)



### SMALL WONDER

CSAC is a microchip-sized prototype that can support highly accurate location and battlefield situational awareness, even in the temporary absence of GPS. Since it's both very accurate and very small, it is highly relevant to the Army's expeditionary vision.



### TIME IS OF THE ESSENCE

The Army relies on GPS not only for navigation but also for timing. Orchestrating the variety of weapon systems, information- and intelligence-gathering systems and communication technologies that support the modern Army's operations requires highly accurate time. Thus GPS vulnerabilities make the entire Army vulnerable.



## CALLING IN MANTECH

In an effort to reduce production costs, CSAC transitioned to the U.S. Army Manufacturing Technology (ManTech) Program in 2010.

ManTech, under the deputy assistant secretary of the Army for research and technology (DASA(R&T)), works closely with the defense industrial base to provide affordable and timely solutions in a low-risk production environment for high-priority Army acquisition projects that face manufacturing challenges.

Upon funding a project, the ManTech office tracks cost, schedule, performance and implementation planning. Thus it enables the efficient transition of these critical technologies to the warfighter on a large scale.

Initiated by DARPA, the CSAC Manufacturing Technology Objective was jointly funded by the Army, the Air Force GPS Directorate and the Office of the Secretary of Defense. CERDEC served as the lead by managing the program and supporting the technical development, requirements verification and testing.

Through ManTech, CERDEC worked with three industry vendors to reduce the cost of parts for CSAC to \$300 per unit in production lots of 20,000 or more per month.

As interest in CSAC grows across DOD, the U.S. Department of Homeland Security and the Federal Aviation Administration, the ManTech effort may enable mass production of CSAC in thousands of units per month, allowing for a significantly lower unit cost for DOD. Additionally, the lower cost could lead to the availability of CSAC in the commercial sector.



## PRECISION NAVIGATION AND TIMING

The goal of CERDEC's PNT Division is complete situational awareness for Soldiers in all circumstances, eliminating their vulnerability to GPS jamming or disruption by environmental conditions. A CSAC on board could provide precise time to the GPS receiver to enable rapid recovery or to protect receivers from interference. (Photo by U.S. Army CERDEC)

In September 2013, the CSAC effort transitioned to the program manager for positioning, navigation and timing (PM PNT), who reports directly to the Army acquisition executive. In support of PM PNT, CERDEC is continuing to look at how to integrate CSAC into various systems as well as mounted and dismounted platforms; how the environment will affect it; and how it could be an asset to various programs of record. CSAC's continued improvements in power, size and accuracy will lead to new applications with benefits reaching beyond DOD.

## CONCLUSION

The small size, low power consumption and low cost of CSAC will enable its use within small devices—handheld radios and GPS receivers, for example—in which atomic clocks would not have been practical, thereby enabling atomic timing precision for a whole new host of applications. Maintaining accurate time when GPS is not available will be important to the warfighter to maintain communications, network

synchronization, electronic warfare and GPS reacquisition once the GPS signal is available again. Our warfighters will achieve overmatch as a result.

*For more information on CERDEC or to contact the authors, go to [www.cerdec.army.mil](http://www.cerdec.army.mil).*

*MR. JOHN DELCOLLIANO is the PNT Integrated Systems Branch chief in the PNT Division at CERDEC, Aberdeen Proving Ground, Maryland. He holds a B.S. in electrical engineering from the Stevens Institute of Technology. He is Level III certified in engineering and is a member of the Army Acquisition Corps (AAC).*

*MR. PAUL OLSON is the chief engineer of the PNT Division. He holds an M.S. in electrical engineering from Fairleigh Dickinson University and a B.S. in electrical and computer engineering from Clarkson University. He is Level III certified in engineering and is a member of the AAC.*



# FACES *of the* FORCE

## MR. ANTHONY D. HICKS

### MR. ANTHONY D. HICKS

#### COMMAND/ORGANIZATION:

Army Logistics University

#### TITLE:

Operational contract support instructor

#### YEARS OF SERVICE IN WORKFORCE: 7

#### YEARS OF MILITARY SERVICE: 20

#### DAWIA CERTIFICATIONS:

Level II in contracting

#### EDUCATION:

Bachelor of professional studies in business and management, Excelsior College; associate degree in applied technology, Central Texas College

#### AWARDS:

Legion of Merit, Meritorious Service Medal (2), Army Commendation Medal (3), Army Achievement Medal (7), Army Good Conduct Medal (6), National Defense Service Medal (2), Armed Forces Expeditionary Medal, Afghanistan Campaign Medal (1 campaign star), Iraq Campaign Medal (3 campaign stars), Global War on Terrorism Expeditionary Medal, Global War on Terrorism Service Medal, Korean Defense Service Medal, NATO Medal

## ALU work leverages active-duty service

Anthony Hicks spent 20 years in the Army, several of them as a contracting officer's representative in Afghanistan. Now retired from active duty, he helps others learn the contingency contracting ropes as an instructor at Army Logistics University (ALU).

Hicks teaches a course on operational contract support (OCS), designed for those in assignments that involve managing, forecasting and administering contract support in a contingency environment.

"OCS is a big part of how we train, deploy and fight, and we need to work with commanders to fully integrate this capability into routine staff functions," Hicks said. "Our preparation for real-world exercises and deployments must include the development of cross-functional OCS cells with the technical and tactical expertise to anticipate, plan, integrate and manage OCS as part of our daily battle rhythm—something that Maj. Gen. Darrell K. Williams and Lt. Col. William C. Latham Jr. (USA, Ret.) touched on in a recent article in *Army Sustainment*" magazine.

ALU's OCS course teaches students the ins and outs of project work statements, independent government cost estimates and purchase requests, as well as the proper oversight techniques necessary for mission success. The class culminates in a capstone exercise that requires students to build a complete requirements packet ready for an acquisition review board. It's a popular course, so if you're interested, sign up early. If you're hoping to be in Hicks' class in the next two months but haven't signed up, you could be out of luck.

## What do you do, and why is it important to the Army or the warfighter?

I serve as an OCS instructor at ALU. Our course is designed for commissioned officers, warrant officers, noncommissioned officers (NCOs) and civilians assigned to tactical unit staffs (at the brigade level through theater Army) who will be responsible for planning for and obtaining supplies, services and construction from commercial sources in support of combatant commander-directed operations through the related contract support integration, contracting support and contractor management functions. Army personnel who successfully complete our course are eligible to receive the “3C” additional skill identifier.

## How did you become part of the Army Acquisition Workforce, and why?

It all began while I was on active duty. While deployed in support of Operation Enduring Freedom in 2007 and 2008, I served as a contracting officer’s representative (COR) for 1st Squadron, 91st Cavalry Regiment (Airborne), 173rd Airborne Brigade Combat Team. As Task Force Saber’s COR, I worked as a liaison for organizational requirements across various OCS stakeholders within the joint operational area. Our contracts employed more than 850 local nationals on seven coalition bases, at an annual cost of \$5.4 million. I had spent almost 12 months in that role when the Army announced the creation of the new 51C military occupational specialty, the contracting NCO. At the behest

of my brigade S-4, I applied and, within a few months, I was selected. Seven years later, upon my retirement from active duty, I applied for a position to serve as ALU’s OCS instructor.

## Can you name a particular mentor or mentors who helped you in your career? How did they help you?

There are several. Without a doubt, each and every member of the 410th Contracting Support Brigade (circa 2009 to 2012); Contracting Officers Brenda Johnson (Mission and Installation Contracting Command at Fort Sam Houston, Texas), and Rajni Anderson (Regional Contracting Center in Kuwait); the 802d Contracting Squadron at Lackland Air Force Base, Texas, which provided so many of us with our Level I tutelage; and, of course, the Acquisition, Logistics and Technology-Integration Office in the Combined Arms Support Command at Fort Lee, Virginia, whom I’ve had the pleasure of working with personally and professionally.

People say that OCS is complex, and that it requires a multifunctional, multidisciplinary capability. Thanks to the people I’ve named here, I’m more capable of meeting these challenges.

## What’s the greatest satisfaction you have in being a part of the Army Acquisition Workforce?

Knowing that what I do makes a difference. The work we do is by no means easy. You have to stay abreast of changes across doctrine, organization, tactics, materiel and logistics, and to do so requires dedication not only to your craft, but to those we support. I think it was [legendary college basketball coach] John Wooden who said, “It is what we learn after we know it all that really counts.” The great thing about this job is that we never really stop learning. I learn as much from my students as I hope they do from me.

## What’s something that most people don’t know about your job?

Since its pilot session in 2009, ALU’s two-week OCS course has trained roughly 4,200 students. But it’s the number of wait-listed students who don’t get in that’s more noteworthy. My recommendation for anyone who’s considering this course is this: apply now. Ninety to 120 days out is ideal. If you’re hoping to attend in 30 to 60 days and you haven’t signed up, you’ve waited too long.

—MS. SUSAN L. FOLLETT



### HEAD OF HIS CLASS

Formerly a COR while on active duty, Anthony Hicks now teaches a course on operational contracting support at ALU. (Photo by Coty Boyd, ALU)



## CARPENTRY AND CONTRACTING

A U.S. Army engineer shows basic carpentry skills to his Cambodian counterparts during Exercise Angkor Sentinel 2016. CCOs—who deploy to all overseas missions and exercises to ensure units have the supplies needed to complete their mission—must always be aware of the legal implications of mixing requirements for U.S. and foreign personnel. (Photo by Master Sgt. Mary Ferguson, 8th Theater Sustainment Command Public Affairs Office)



# REACHING WAY BACK

The 413th CSB works to strengthen teamwork between CCOs and attorneys—a relationship that’s becoming more important as the military’s operational focus shifts to the Pacific.

*by Capt. James S. Kim*

**I**n tomorrow’s ever-shrinking world, U.S. forces will have a continually evolving mission to provide full spectrum military operations across the globe. It is in this dynamic atmosphere that contingency contracting officers (CCOs) find themselves with the unenviable task of juggling the dual missions of supporting garrison contract operations while always maintaining readiness to deploy to a forward area in support of expeditionary, contingency and training operations. In the unique and unpredictable atmosphere of deployed operations, continued and reliable reach-back legal support is paramount to mission success.

In the complex area of operations encompassing the Pacific theater, there is a constant flow of missions, training exercises, humanitarian aid and disaster relief, all going on across more than a dozen countries. As the primary contracting mechanism for the U.S. Army Pacific, the 8th Theater Sustainment Command and the 25th Infantry Division, CCOs from the 413th Contracting Support Brigade (CSB) provide contracting support to more than 25 overseas missions, training exercises and key leader engagements in any given fiscal year.







#### TRAINING FOR DISASTER

A contracting team works together during the weeklong 413th CSB Disaster Training Exercise 2016 at Joint Base Pearl Harbor-Hickam, Hawaii. Because the relationship between a deployed contracting officer and the garrison-based contracting attorney is so important, contracting attorneys live with their CTs during the exercise. They also inject surprise legal events into the scenario, so CTs get used to managing the legal ramifications of unexpected scenarios that arise overseas. (Photo by Master Sgt. Veronica Stewart, 413th CSB)

Unlike the established processes and systems for Operation Iraqi Freedom and Operation Enduring Freedom, the high operational tempo environments of the Pacific pose a unique set of challenges. These missions and exercises, such as Lightning Strike, Angkor Sentinel, Pacific Pathways and Khaan Quest, demand the same end results as a garrison contracting office, but with a severely truncated timeline, limited resources and language and cultural barriers.

CCOs must operate within local acquisition customs and methods and navigate the cultural and legal nuances of each country, while maintaining the strict standards of the Federal Acquisition Regulation (FAR) and the ethical, fiscal and legal requirements of the contracting realm.

With deployed contracting, an additional set of rules and requirements comes into play, along with all the garrison regulations. CCOs, together with their advising contract attorney, must identify and address a plethora of other potential issues that could affect a requirement. CCOs are forced to not only think outside the box, but do so while expanding their box of knowledge.

#### 'FAR' FAR AWAY

Factors that are nonexistent in a garrison setting take on an entirely new meaning overseas. Which appropriation will pay for the contracts? Are there any acquisition and cross-servicing agreements (ACSAs) in play, and do they influence the nature of the requirement? What are the implications of neglecting to include the Defense Base Act insurance clause? Is the vendor



base capable of financially supporting our contracts, knowing that payment cannot be made until performance? In addition to assessing the effects of operational contract support on a local economy, a CCO must also be wary of the legal and ethical implications of overseas contracting.

Although all CCOs are well-versed in the basic tenets of the FAR, it is the contract attorneys who thrive on deciphering this massive tome. In a garrison setting, the attorneys are involved in every aspect of acquisitions, from the acquisition strategy plan to award and beyond. Unfortunately, the sheer volume of operations coupled with the limited number of attorneys make this level of involvement neither possible nor practical in the forward deployed environment of the Pacific.

Moreover, it would not be fiscally responsible to send an attorney on every overseas operation or training mission. Therefore, each CCO is presented with the challenge of bridging the requirements of the mission with the FAR, while receiving reachback legal support from attorneys thousands of miles away to ensure that he or she is providing the same standard

of legal advice and support that's offered in garrison.

### ACTIVE MEMBERS OF THE CONTRACTING TEAM

The 413th CSB is constantly vigilant in its goal to inject and embed contract attorneys with its contracting teams (CTs). With four attorneys spread across three offices in Hawaii and Alaska, the goal is to provide face-to-face legal advice whenever practical, including contingency contracting. Each mission is assigned to a designated contract attorney who serves as the primary legal adviser.

This begins with the planning and solicitation phase in garrison, providing instant reachback support when the CTs are forward, and concludes with the successful completion of the mission. The intent in providing each CT with its own dedicated attorney is multifaceted. It provides the CCO a single point of contact to reach back to in the event that immediate legal advice and guidance are required. Furthermore, the assigned attorneys are familiar with the mission, the requirements and the contingencies that will undoubtedly arise.

Even the simplest aspects of contracting have a tendency to become complicated in an overseas environment. With different "colors" of money, cultural and business differences, unique requirements and ethical issues contributing to an already constantly evolving situation, CCOs know to seek legal advice prior to making a decision or obligating the government prematurely. Even taking time differences into account, legal advice can often be obtained in minutes, and is never more than a few hours away. Prior to departing on a mission, CCOs reach out to the servicing attorney and identify potential legal issues they are anticipating, and the attorney is put on notice that reachback support under a tight turnaround time could likely be sought during this period.

Mission preparedness doesn't begin with the identification of a contingency or overseas training exercise. The 413th CSB takes a proactive approach, providing as much training and education as possible. Contract attorneys conduct monthly training on topics covering the gamut of contracting, from end-of-year fiscal issues and ethical concerns in foreign countries

### PARTNERS

Maj. David Garrison, left, 413th CSB CCO, works closely with the Royal Cambodian Army liaison; Master Sgt. Warren Cooper, contracting officer's representative; and Maj. Steven Huber, resource manager, during Angkor Sentinel 2016, an annual U.S.-Cambodia exercise. Understanding the cultural and legal restrictions is crucial to developing a successful partnership with foreign militaries—the risk of making unauthorized commitments is real, in a collaborative overseas exercise without a contracting attorney on site. (Photo by Master Sgt. Mary Ferguson, 8th Theater Sustainment Command Public Affairs Office)



*Even the simplest aspects of contracting have a tendency to become complicated in an overseas environment.*

to the dangers of unauthorized commitments by government purchase card holders. The legal office takes concerns raised and lessons learned from previous missions and CCO after-action reports to identify relevant topics.

In another effort to shed light on potential legal issues that can arise in contingency operations, the 413th legal office actively participates in the annual Disaster Training Exercise (DTX).

DTX is a joint exercise with CCOs from the 413th CSB, the 411th CSB in Yongsan, Korea, and the 766th Specialized Contracting Squadron at Joint Base Pearl Harbor-Hickam in Hawaii. In the truncated timeline of one week, they are required to provide cradle-to-grave contracting support involving both simple cash purchases using Standard Form 44 acquisitions for bottled water and office supplies, and the more complex acquisitions involving blanket purchase agreements, contracting officer representatives and contract modifications.

During DTX, an attorney sleeps, eats and lives with the CTs while providing legal support and advice. This level of involvement builds camaraderie and team unity, and helps CCOs recognize legal issues that can arise during contingency operations.

In addition to providing legal, fiscal and ethical guidance, the contract attorney also injects legal issues into DTX. The legal injects are meant to be dynamic and thought-provoking, forcing the CCOs to think outside the box and recognize the potentially far-reaching legal implications of a simple occurrence. For example, these injects demonstrate how a simple request from the host nation's military to borrow equipment can lead to an

analysis of bona fide needs, the Purpose Statute, ACSAs, bribes and improper gifts, and culminate in a possible claim, unauthorized commitment or Antideficiency Act violation.

## CONCLUSION

As U.S. forces continue to shift focus to the Pacific theater, the frequency of overseas operations will undoubtedly continue to rise, along with the complexity of the required contracts. As a result, the interdependent relationship between CCOs and contracting attorneys will become much more important. To foster development of this relationship, the 413th CSB has outlined several keys to success:

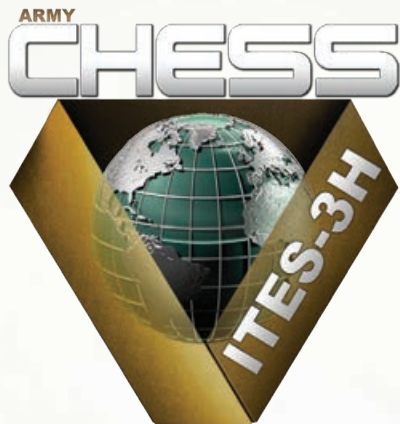
- Continue to assign individual attorneys to missions.
- Have attorneys conduct training for CCOs on a regular basis.
- Incorporate attorneys into an annual capstone training exercise, such as the DTX or the DOD Operational Contract Support Joint Exercise.
- Encourage continued training and development of emerging topics for attorneys.
- Encourage continued interaction between Army contract attorneys with their sister service counterparts.

As the U.S. role in overseas missions and exercises continues to grow, the requirements for a CCO will become increasingly complex. With this added responsibility, authority and discretion comes the inherent danger of abuse and complacency.

In an effort to steer clear of this, the 413th CSB is constantly searching for innovative ways to provide the legal training for its CCOs and increase attorneys' presence and involvement in overseas missions. It is only through this level of involvement that contract attorneys can provide advice on interpreting the FAR and guide CCOs in navigating the ethical, fiscal and legal landmines that litter the acquisition battlefield.

*For more information, please visit the 413th CSB website at <http://www.acc.army.mil/ecc/413th> or contact the author at [james.s.kim22.mil@mail.mil](mailto:james.s.kim22.mil@mail.mil).*

*CAPT. JAMES S. KIM is the deputy command judge advocate with the 413th Contracting Support Brigade at Fort Shafter, Hawaii. He holds a J.D. from Loyola Law School, Los Angeles, and a B.A. in history and economics from Boston College.*



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# FACES *of the* FORCE

## MR. DANIEL COWELL

### MR. DANIEL COWELL

#### COMMAND/ORGANIZATION:

Theater Contracting Center,  
409th Contracting Support Brigade

#### TITLE:

Contracting officer

#### YEARS OF SERVICE IN WORKFORCE: 13

(6 in Army acquisition; 7 in Air Force  
acquisition)

#### DAWIA CERTIFICATIONS:

Level III in contracting;  
Level I in program management

#### EDUCATION:

MBA, University of Colorado; B.S. in  
environmental geography, Austin Peay  
State University

## Contracting career takes flight

**D**aniel Cowell's first experience with Army acquisition was an aircraft project that never really got off the ground. An inauspicious start, maybe, but one that he found to be invaluable.

Cowell was working for the Air Force Space Command in 2010 when he heard about a project that the U.S. Army Space and Missile Defense Command was sponsoring. "It was the Long Endurance Multi-Intelligence Vehicle (LEMV), part blimp, part air vehicle, and the goal was to use it for extended surveillance and intelligence gathering," he explained. "It was a high-priority project to quickly field an asset that would benefit the theater commanders. We used a nontraditional type of contracting called 'other transaction authority,' which allowed us to streamline many of the traditional regulatory processes that take a lot of time and resources."

Although the LEMV project was eventually canceled, Cowell said, "the project went from technical drawings to an actual air vehicle the size of a football field that flew above Lakehurst, New Jersey, in 26 months. Being associated with a failed project can be humbling, but I wouldn't trade the lessons learned and the experience gained for anything."

Cowell worked in Air Force contracting for seven years before coming over to the U.S. Army Contracting Command six years ago. In November 2015, he deployed to Germany, where he's part of the 409th Contracting Support Brigade's Theater Contracting Center (TCC).

*"I want to be part of the change in the government acquisition culture, and this has to start with me."*

“Moving abroad with the Army has given me an appreciation for what the military goes through with each PCS [permanent change of station]. My office operates at a high tempo, so jumping in required a steep learning curve on local policies,” said Cowell, who spent two years on active duty to help pay for college. “Being overseas allows me to be more closely involved in supporting our deployed troops. Our office also awards contracts that provide humanitarian assistance, from emergency supplies for refugees to infrastructure improvements within small villages. As a civilian, an overseas assignment in Army contracting is an extraordinary opportunity, and I’m honored to be given the opportunity.”

#### **What do you do in the Army? Why is it important?**

I support the warfighter by providing contract vehicles to acquire products and services needed to accomplish the mission. As a contracting officer, I have the opportunity to positively affect the lives of Soldiers, DOD civilians and the contractor workforce by working hard to advise on the right type of contracts awarded at a fair price and delivered on time. If I do my job well, the Army’s mission is effectively supported and people are provided for.

#### **What has your experience been like? What has surprised you the most?**

I’ve found that most everyone wants to do their jobs well and that breakdowns are usually the result of bad communication. Contracting can be a much simpler process if the time is taken to explain the “why” behind the regulations. As I gain experience, I find it more and more important to help the customer get a perspective on why certain aspects of the acquisition process are necessary.

#### **What are the biggest differences between doing your work outside the United States and doing the same thing stateside?**

In many ways, contracting is contracting wherever you are, but there are differences. Overcoming the language barrier is tough when dealing with local contractors, but we have a great team of local nationals within the TCC who help us in this area. Staying current on the established exchange rates is also challenging. In most contracts here, we price in euros and fund with dollars using an exchange rate directed by the undersecretary of defense (comptroller). The rate changes periodically, so it’s imperative to remember to use the current rate at the time of contract award.

#### **What’s the hardest part of your job? How do you overcome it?**

Fighting apathy. There is a strong push to obligate funding, so often it’s not a popular decision to slow down an acquisition in order to negotiate. I’m sure many of us have heard something to the effect of, “We have the funding, so what’s the problem?” I’m not against obligation goals, and there are times when we need to execute contract actions quickly. But often we give in because of pressure from our customer or the temptation to take the easy way out and accept a contractor’s proposal as is. I want to be part of the change in the government acquisition culture, and this has to start with me. I find personal satisfaction when I can combine quick action with strong negotiations.

#### **What one skill or ability is most important in doing your job effectively?**

Business skills are key; however, I believe it all boils down to effective communication. I have to work with my customers to help them communicate their requirements clearly. When negotiating contract actions, I have to communicate the government’s objective effectively with the contractors. Lastly, I need to be able to document the contract file sufficiently, so that someone can come behind me and understand why I made the decisions that I made.

#### **What advice would you give to someone who aspires to a career similar to yours?**

Find ways to enjoy what you do, and be willing to take chances to get the most out of the contracting career field. I’m driven to be part of the generation that helps Army contracting find smarter and more efficient ways of accomplishing our mission. Change excites me and encourages me to seek out new ideas.

#### **If you could break the rules or make the rules, what would you change or do?**

I would like to figure out a way to change the compensation structure within the contracting field to tie incentives to negotiated savings. It’s challenging to obligate all the funding that is provided, and speed of execution still needs to be part of the equation; however, I believe we could help move the culture in a better direction if our review and our compensation were directly tied to how hard we negotiated on the government’s behalf.

—MS. SUSAN L. FOLLETT





## BIG DATA PARTNERSHIP

How can the Army reduce the risk of vendor lock-in when it comes to big data? The answer is simple: Partner with industry to develop standards for interoperability and place a premium on adaptive and iterated innovation control. (SOURCE: 4X-image/iStock)



# OPEN SOURCE BIG DATA

PEO EIS and ARCYBER found something interesting in analyzing the government's off-the-shelf big data systems: Nearly all are built using high-quality, open-source software. With a similar, government-owned platform, DOD would no longer pay high licensing fees. It could increase the competitive playing field and make all of its big data analytics work together.

*by Maj. Isaac J. Faber and Ms. Elissa Zadrozny*

**B**ig data analytics—the process of examining massive data sets containing a variety of data types to uncover hidden patterns, correlations and other strategic business and operational information—is among the hottest trends in information technology and one of the Army's highest priorities. The Army chief information officer/G-6 (CIO/G-6), in releasing the Army Data Strategy in February 2016, stated, “The Army will utilize a two-pronged approach for managing big data. First, the Army will redouble its efforts to implement effective data management methodologies to ensure that data are authoritative, timely, secure and of the highest quality. Second, the Army will develop a process for the identification, development and implementation of efficient decision support and analytical tools to best maximize the use of information derived from big data extrapolation.”

Toward this end, the Program Executive Office for Enterprise Information Systems (PEO EIS) and the U.S. Army Cyber Command (ARCYBER) have been piloting a government off-the-shelf (GOTS), open-source platform based on open-source software and open standards. This effort is intended to potentially inform the way ahead.

The Army CIO/G-6 understands that Army data scientists, technologists and acquisition professionals need to work together and focus on identifying the best and most efficient ways to partner with industry to help the Army realize the promise of big data.

That's because, in adopting a big data system, you gain an ability to sift through large volumes of data from a variety of sources at a faster rate than traditional databases. This is done by breaking the data into smaller pieces and spreading the processing of that data across many machines in "parallel" and returning the response to a consolidation point. This is known as parallel computation, and it's what is needed to tackle the data management challenges faced by our cyber network defenders. Google is the most recognized pioneer in tackling the big data challenge of indexing and searching the unceasing volume, variety and velocity—known as the 3Vs of big data—of structured and unstructured data.

### BIG DATA TOOLS AND TECHNOLOGY: A PRIMER

Hadoop is a free, Java-based programming framework that supports the processing of large data sets in a distributed computing environment. It is also an important tool to consider when implementing a big data strategy. Hadoop is sponsored by the Apache Software Foundation, which is dedicated to supporting open-source software projects for the public good. At its simplest, Hadoop provides a parallel-processing computing framework for data storage and processing. This is important for enterprise-level analysis because of physical limitations on how quickly a single machine can process information.

For example, when deploying a basic Hadoop system you first build all indexing strategies. These indexes are what allow you to organize data in a way that makes it quickly searchable, like a table of contents. For organizations looking to develop products to support big data, this first step has become a point of product differentiation, as performance is based on how well data is indexed. Product



### A HANDFUL OF OPTIONS

A vendor- and product-neutral government off-the-shelf (GOTS) platform provides an environment for developing complex, cyber-hardened systems that lend themselves to frequent technology refreshes and rapid insertion of cutting-edge technology. (SOURCE: USAASC/Exdez/iStock)

differentiation is key for companies looking to distinguish their product or service in the marketplace. Other differences (or divergences) become more evident as applications are built on top of the data store. Differences in visualizations, data science libraries, cloud architecture and access management are a few examples. While many of the same open-source distributions are used as a starting point, the end result is a product that is intended to work, on its own, from infrastructure to the user.

The government is developing a strategy to enable communities with big data

needs to have access to this technology. There are special considerations that need to be taken into account to ensure that this is done in a sustainable manner. A strategy of an open government platform with vendor-provided applications and infrastructure is an approach derived, in part, from the National Institute of Standards and Technology's (NIST) cloud computing reference architecture. Big data systems leveraged for cyber analytics are typically built using cloud standards and technology. For the end user, this means access to all of the services through a modern Web browser. For engineers, it means building access through a modular

## BIG DATA GLOSSARY

**Analytics.** The synthesis of knowledge from information. Analytics is used to refer to the methods, their implementations in tools, and the results of the use of the tools as interpreted by the practitioner. An analytic is one of those tools.

**Big data.** Consists of extensive data sets—primarily in the characteristics of volume, variety, velocity and/or variability—that require a scalable architecture for efficient storage, manipulation and analysis.

**Cloud.** Computing that is done through a number of computers linked together and accessed through the internet.

**Data science.** The extraction of actionable knowledge directly from data through a process of discovery, or hypothesis formulation and hypothesis testing.

**Data scientist.** A practitioner who has sufficient knowledge in the overlapping regimes of business needs, domain knowledge, analytical skills, and software and systems engineering to manage the end-to-end data processes in the data life cycle.

**Distributed computing.** A computing system in which components located on networked computers communicate and coordinate their actions by passing messages.

**Hadoop.** A free, open-source Apache Software Foundation platform that can deal with large amounts of semistructured and unstructured data, and data that needs a data discovery process in order for it to be analyzed.

**Horizontal scaling.** To make use of distributed individual resources integrated to act as a single system. It is this horizontal scaling that is at the heart of the big data revolution.

**Open-source software.** Software for which the original source code is freely available. Such software may be redistributed and modified, and is continuously improved or adapted by the programming community.

**Open-standards architecture.** An architecture development approach that utilizes open standards to reduce the cost and risk of ownership of weapon systems, delay system obsolescence and allow fielding of capability more quickly.

**Parallel computing.** A group of computers linked together for processing. Also called parallel processing.

**Vertical scaling.** Increasing the system parameters of processing speed, storage and memory for greater performance.

*(SOURCE: National Institute of Standards and Technology, TechTarget.com, Oxford Dictionaries, businessdictionary.com, acqnotes.com)*

framework of infrastructure, platform and software applications (or “apps”).

Consider the following: This morning, you probably awoke to an alarm that you set on your mobile phone. In addition, you probably reviewed email messages or read today’s headlines over coffee. Perhaps you checked the weather or traffic before leaving home for the day. All on the same device.

You probably rely on several apps on your phone to improve productivity and quality of life. What you probably do not think about is how different organizations develop each of these apps across a very diverse and competitive industry. Most modern software development efforts are based on a NIST-type modular framework, where applications are built to operate on a common, shared platform. For example, Apple iOS, Android, Xbox and PlayStation are platforms that provide an environment in which innovation can flourish. The environment in which an app is created and deployed is completely separate from the app itself. This environment includes not only the platform, but an entire development system that encourages seamless integration. The user doesn’t see this technical nuance, but it’s enormously important when considering life cycle costs and quality.

With software sustainment, the choice of platforms is the linchpin that allows for versioning, expansion, adaptability and flexibility. A robust platform enables independent apps to have limited deployments that can scale to a large user base when ready. In the same way, applications can be added or removed without impact to related services. Using a common platform is a distinct tradeoff for end users. Applications will be limited to platform services; however, more individuals can participate in development.



This creates more diversity and competition. The personal choice of your mobile phone platform is an excellent example where you might choose a device based on the variety of applications that can be built and used on it.

### THE LOCK-IN PROBLEM

One of the major challenges with the government procurement approach to acquiring technical solutions is “vendor lock-in.” Vendor lock-in occurs when a customer using a specific product or service cannot easily transition to a competitor. It is usually the result of proprietary technologies that are incompatible with those of competitors.

Historically, large technical system contracts have been awarded for total solutions that create dependencies on a particular vendor or provider. These dependencies make a single contractor the sole provider for an extended time because the startup investment for a new solution is cost-prohibitive.

Consider weapon system software developed using commercial off-the-shelf (COTS) products that are relevant to today’s standards and technology. If the initial award is given to a firm using a proprietary platform, the government may be forced to continue working with that firm for decades, even if the firm sells the technology or operates under a different company name. This type of lock-in is created because of government reliance on existing solutions and long development and procurement cycles for replacements.

Operating systems, databases and office productivity suites are other examples of capabilities that, once purchased, are nearly impossible to re-compete without massive organizational effects. Throughout the enterprise, proprietary solutions

can become the center of policy and workflow, making product changes difficult and cost prohibitive. So, how can the Army reduce the risk of vendor lock-in when it comes to big data?

The answer is simple: Partner with industry to develop standards for interoperability and place a premium on adaptive and iterated innovation control. The Army should build a core, standards-based platform and encourage vendors to develop applications that are adaptable and responsive to new requirements on that platform.

The cybersecurity domain offers an excellent test bed to explore this approach. Within the cyber domain, an enormous amount of data has to be collected and analyzed to find the most advanced threats. With this come significant requirements that cross technical and policy considerations. The capability required by the cyber community comes from the service (an “analytic”) or services that sit on top of a platform.

With product differentiation, nearly every analytic vendor uses a proprietary platform when building an analytic. This creates a potential vendor lock-in trap. There is a legitimate fear that when committing to a vendor-specific analytic, a proprietary platform will come along with it, excluding participation from other vendors. Lack of portability and interoperability of this type of solution lessens big data’s potential for the Army to store and share data in one place for use with different analytics from a wide variety of sources.

Because the level of effort to migrate data to a platform is so high, most likely there would not be available funding for investment in multiple platforms. To this end, over the past few years, PEO EIS

and ARCYBER have been experimenting with a big data cyber-analytics pilot.

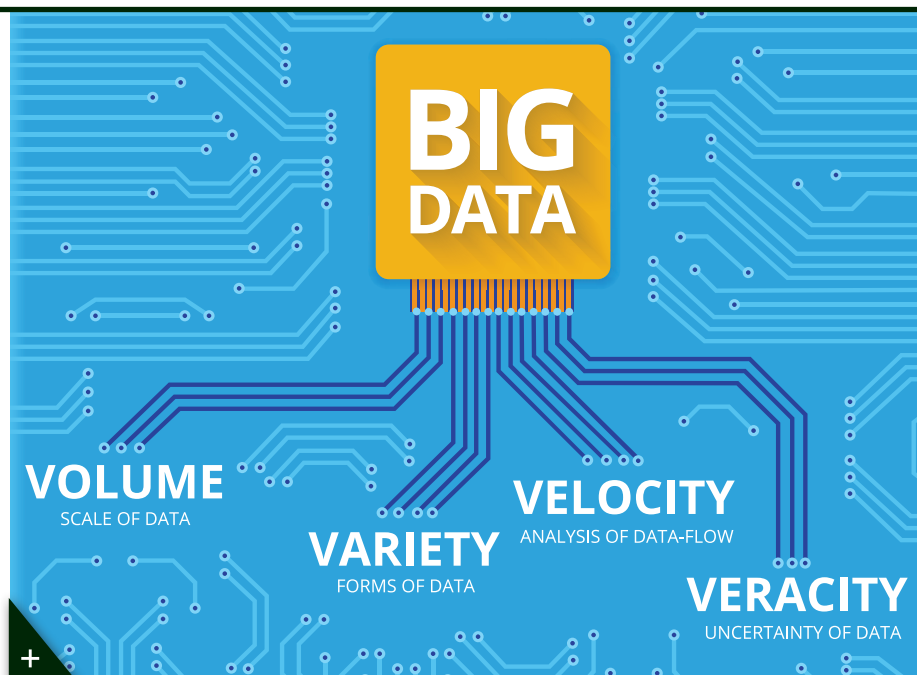
Reviewing the technical requirements in the big data community uncovered something interesting: Nearly all vendor products are now based, largely, on high-quality open source distributions from the Apache Software Foundation. In addition, there are existing capabilities within DOD built for specific cyber use cases.

The pilot leverages these two resources to build a no-cost licensed platform that enables multiple participants to provide software. The platform uses open standards where most big data vendors’ products can easily be adapted. More importantly, the cyber community can develop its own small-scale capabilities without any additional contracting actions. This enables a competitive environment whereby vendors of all sizes can participate and the government has low risk of vendor lock-in.

### CONTROLLING COSTS

The undersecretary of defense for acquisition, technology and logistics directed 22 years ago that all DOD components and agencies use open systems specifications and standards for acquisition of weapon systems implemented through what is called open systems architecture (OSA). OSA is a key tenet of Better Buying Power (BBP) 3.0 for promoting competition. OSA principles are also supportive of and consistent with the use of open source software (OSS), which is considered commercial computer software, in systems.

The big data cyber analytics pilot looks to OSS as a way to encourage industry partnerships. It also seeks to obtain maximum use of limited resources while avoiding vendor lock-in and licensing



### MASSIVE DATA CRUNCH

Extracting useful information from the overwhelming amount of data available in the digital world is difficult. The challenges are summed up in the “3 Vs”—volume, variety, and velocity—plus a fourth, veracity, which captures the difficulty of validating the source and the reliability of information.

(SOURCE: Lightcome/iStock)

fees. Cloud-based access and the use of OSS development tools that allow participatory community feedback has created a force multiplier, bringing together multiple vendors under partner DOD organizations to create a GOTS big data platform. Other Army and DOD components can also be made aware of the platforms’ availability and are then able to deploy COTS or other apps to further their organizations’ missions.

The Army can help meet its missions by reducing barriers to sharing software through the use of OSS. The advantages include increased transparency and openness with industry. Writing contracts that favor maximum sharing, collaboration and adequate data rights to the government allows release of software as OSS by default. The technical core of openness is supporting competition and the ability to rapidly deploy capabilities to the force with the ability to add components and build larger systems. Development of

competing components is motivated by larger marketplaces for those components.

Within the Army’s elite cyber units, including protection teams and regional defensive cyber operations divisions, capabilities are poorly interconnected single-vendor solutions, each only meeting one or two requirements. In an odd paradox, the security for the DOD Information Network is, in some way, dependent on how well our defenders navigate the capabilities they are provided. This increasingly complex web of disparate solutions is a call to reconsider future materiel developments and change the paradigm of vendor-bundled COTS solutions as a cure-all for competitive sourcing, rapid deployment and cost control. The common big data platform is just one example of how it’s possible to have openness with industry that still promotes competition and innovation at a low cost.

### CONCLUSION

A vendor- and product-neutral GOTS platform provides an environment for developing complex, cyber-hardened systems that lend themselves to frequent technology refreshes and rapid insertion of cutting-edge technology. Sharing that platform with industry through the open source communities or common application programming interfaces inserts key capabilities as needed at the lowest possible cost through competitive sourcing rather than closed proprietary solutions. The adaptability and innovation needed to address legitimate national security concerns about maintaining a defended cyberspace domain can be achieved by supporting the Army’s efforts around big data cyber analytics and BBP 3.0 goals of achieving dominant capabilities while controlling life cycle cost.

For more information, contact Maj. Faber at [isaac.j.faber.mil@mail.mil](mailto:isaac.j.faber.mil@mail.mil).

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#### THE SHAPE OF THE FUTURE

FVL is meant to develop replacements for the Army's UH-60 Black Hawk, AH-64 Apache, CH-47 Chinook and OH-58 Kiowa helicopters. Four different sizes of aircraft are to be developed and will share common hardware such as sensors, avionics, engines and countermeasures. Each class of aircraft will have the potential for service-unique or mission-specific variants. (Image courtesy of PEO Aviation)



# A BIG LIFT

Partnering with industry early in a program life cycle can highlight new and unexpected ways to act on Better Buying Power principles. One industry-academia consortium offers research and development, facilitates study groups and provides input on draft requirements for the next generation of vertical lift aircraft.

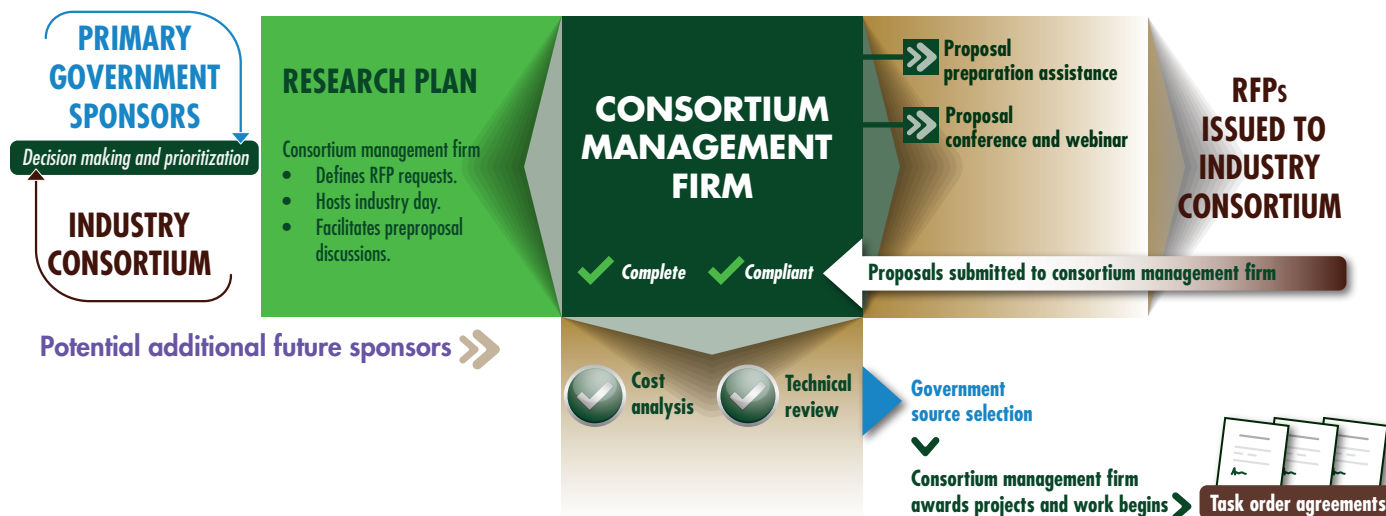
*by Mr. Richard Kretzschmar*

**A**s stewards of constrained and precious resources, Army project managers are continuously challenged to think strategically to provide the most affordable, value-added military capability to the warfighter. In 2010, Ash Carter, then undersecretary of defense for acquisition, technology and logistics, codified a set of fundamental acquisition principles, titled “Better Buying Power,” intended to achieve greater efficiencies through affordability, cost control, elimination of unproductive processes and bureaucracy, and promotion of competition. Using these principles is not the sole responsibility of the project manager; rather, all stakeholders with bearing on the execution and eventual outcome of a major defense acquisition program

should be considering their potential role in implementing these best practices.

A particularly important stakeholder in this endeavor is the industry partner. Given its alternate perspective, industry input early in a program life cycle provides an opportunity to consider methods to implement the better buying power principles that might not be considered from a solely government perspective. Moreover, transparent discussions with industry on emerging operational requirements allow government representatives to make more informed decisions on the state of critical technology maturity and the marginal costs associated with using these technologies to meet these emerging system requirements.

FIGURE 1



#### WORKING THE PROCESS

The “other transaction” agreement process allows government sponsors and consortium members to discuss topics of interest for which the government sponsor can submit research plans. The consortium management firm serves as the clearinghouse to consolidate and issue requests for proposal, assess submitted proposals for compliance and completeness and coordinate with the government sponsor executing the source selection. Pending completion of the source selection, the task orders are awarded to the selected consortium member. (SOURCE: Vertical Lift Consortium)

Transparent discussions also facilitate opportunities for shared investment. The earlier these discussions begin in the program planning process, the greater the opportunity to benefit from industry involvement.

As a “new start” developmental program—one receiving funding for the first time—the Future Vertical Lift (FVL) program is perfectly suited to garner the maximum benefit from this deliberate and transparent interaction with industry partners.

*Early success of the FVL initiative and related technology development efforts is in no small part the result of deliberate, consistent and enthusiastic involvement of industry.*

#### WHAT IS FUTURE VERTICAL LIFT?

In the National Defense Authorization Act for Fiscal Year 2009, Congress directed DOD to “outline a joint approach of the development of vertical lift aircraft for all the military services.” In response, the secretary of defense established the DOD FVL initiative to address vertical lift capability requirements, focus technology development and determine feasible and affordable solutions in support of the joint warfighter beyond 2030. FVL is envisioned as a family of vertical lift aircraft that is subdivided into multiple payload classes with significant overlap and commonality of software and hardware components. Each class of aircraft will have the potential for service-unique or mission-specific variants.

The dedicated and talented service representatives who execute the mission of the FVL initiative are organized into four integrated product teams: requirements (RIPT), science and technology (SIPT), acquisition (AIPT) and common systems, each focused on coordinating and synchronizing service activities in their respective area of expertise. (See Figure 2, Page 113.) Since inception, these groups have executed a number of efforts

to develop governing documents for the FVL programs of record. These efforts include:

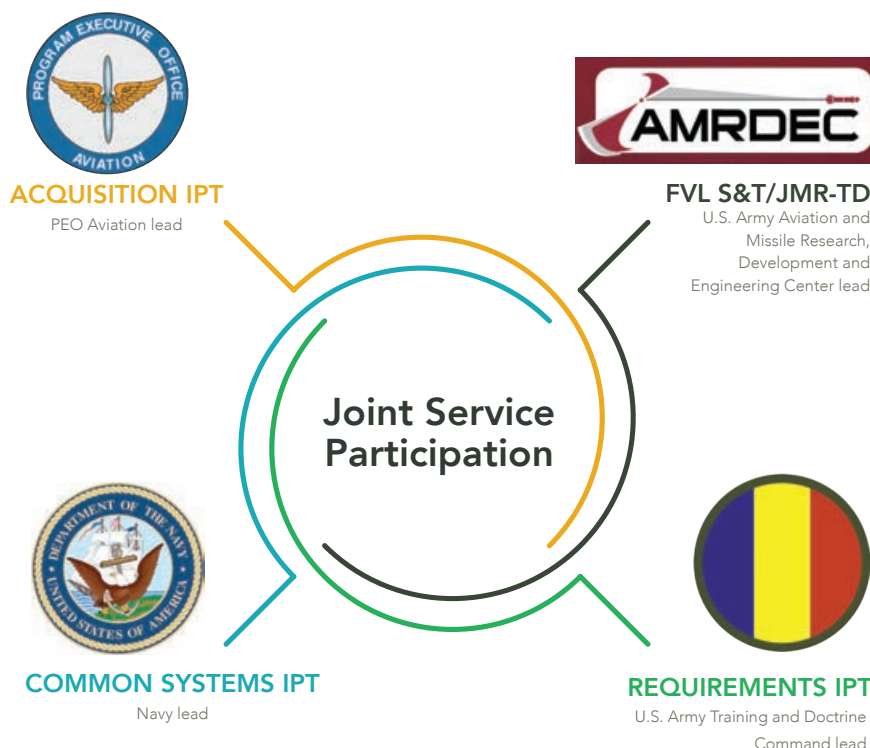
- 2009 FVL Capabilities-Based Assessment and Science and Technology Plan.
- 2012 FVL Strategic Plan (signed by the deputy secretary of defense).
- 2013 Initial Capabilities Document for FVL Family of Systems (approved by the Joint Staff).
- 2014 FVL Concept of Operations (approved by the Joint Staff).
- 2016 Initial Capability Refinement Document for the first FVL program of record (approved by the Joint Staff).

The FVL programs focus on meeting the requirements associated with the existing fleet of aircraft identified in the FVL initial capabilities document, thereby providing a strategic advantage to the joint warfighter community through significant improvements in vertical lift capability. Elements of the FVL strategy include: a joint service, departmentwide, portfolio approach to a family of systems; common systems and open architecture; enhanced science and technology (S&T) investment to mature critical technologies; setting conditions for successful transition to program(s) of record; and most pertinent to this article, industry and academia partnership or interaction early in the program life cycle.

## INDUSTRY'S EARLY PARTICIPATION

Industry partnerships in FVL and related activities have been numerous, multifaceted and critical to the many successes to date. Although it's impossible to capture all efforts succinctly in this article, one of the significant contributions is worth discussing in some detail. To take advantage of industry expertise and experience to inform requirements, develop strategies and assess technological maturity,

FIGURE 2



## AROUND WE GO

Participants in the FVL initiative are organized into four integrated product teams, with each concentrating on service activities in their area of expertise. These IPTs have been key contributors to a number of governing documents, including a capabilities-based assessment, an initial capabilities document and an initial capability refinement document. (SOURCE: PEO Aviation)

the Vertical Lift Consortium (VLC) was established in the early years of the FVL initiative.

Formed in 2009, the VLC has partnered with the government to conduct research and development efforts for emerging aviation technologies. Its 67 member organizations represent large and small businesses, research universities and innovative, nontraditional technology firms. The VLC vision is to be a cohesive national resource that government customers can efficiently access for innovative technologies to fulfill critical DOD vertical lift needs. This invigorates the

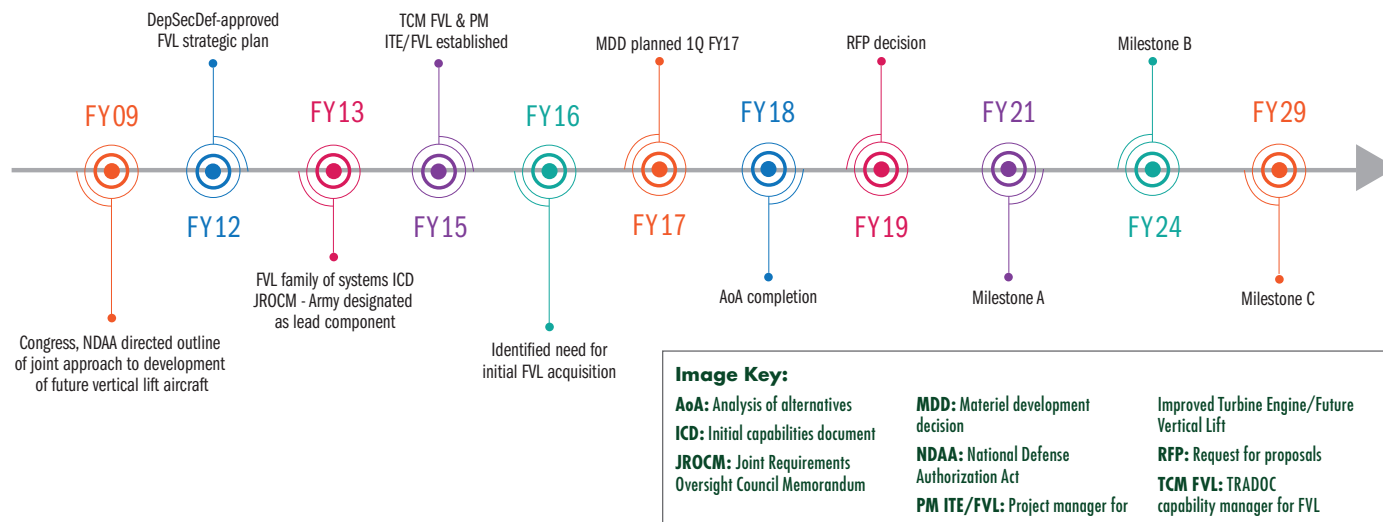
U.S. industrial base, drives innovation and achieves an international competitive edge. The VLC has worked closely with the government in several ways during the past year, some of which are noted below.

**Achieving affordable programs:** At the request of the FVL Joint Council of Colonels, the VLC undertook an effort to study FVL requirements, acquisition and commonality. Through meetings, workshops and focused team efforts, the VLC produced recommendations for more efficient and affordable development and delivery of an FVL family of systems.



FIGURE 3

**FVL is a joint and DOD initiative to address vertical lift capability requirements and determine feasible and affordable solutions in support of the joint warfighter beyond 2030.**



### WHAT LIES AHEAD

The joint FVL program was created seven years ago to address vertical lift capability requirements and determine feasible solutions to support warfighters in 2030 and beyond. Among the key milestones for FVL are an RFP decision in FY19 and Milestone C 10 years later. Low-rate initial production for the first capability set is projected for 2030. (SOURCE: Vertical Lift Consortium)

**Transparency in emerging requirements:** The VLC hosted two FVL concept of operations workshops for the FVL RIPT, with more than 40 VLC member organizations participating. A third workshop with the FVL AIPT focused on the business case analysis for FVL. These workshops garnered industry perspective on the viability and affordability of pursuing specific combinations of operational requirements.

**Rotorcraft cost modeling collaboration:** VLC members collaborated on cost modeling software to estimate design costs of future helicopters. An existing government standard cost model was expanded and calibrated using data from Bell Helicopter, Sikorsky and Boeing for the drive system from each of three rotorcraft (the UH-1Y Venom, the UH-60M Black Hawk and the CH-47 Chinook). The model will be expanded further as more data become available. VLC also provided recommendations to the Army for improving existing cost models for estimating research and development costs of new concepts.

**Joint common architecture:** A key to the early success of the FVL effort is an enhanced and coordinated S&T program dedicated to maturing critical technologies identified by the FVL

SIPT. Led by the U.S. Army Aviation and Missile Research, Development and Engineering Center (AMRDEC), the Army's Joint Multi-Role Technology Demonstrator (JMR-TD) is the flagship program anchoring the Army Aviation S&T portfolio. The VLC collaborated with the JMR-TD project office to continue the development of version 1.0 of the joint common architecture reference architecture. This development effort defined the fundamental concepts and components of an aircraft software architecture and their relationships to guide the development of solution architectures.

Subject matter experts representing 10 VLC organizations provided direct support to this development effort, and review and comment was provided from the broader VLC membership. These efforts have set the stage to pursue what is potentially the greatest opportunity for life cycle cost reduction across the FVL family of systems through software reuse, improved efficiency and flexibility in software integration and quicker and more efficient certification of software modifications.

**Program efficiency:** VLC also has been working to establish its other transaction agreement (OTA), a dedicated contracting

vehicle that provides flexibility to government organizations in selecting competitive research and development projects to mature technology and to initiate studies and analysis efforts associated with FVL and related activities. [For more on the value of using other transaction authority with high-tech consortiums, see “In the Shark Tank,” Page 82, in the January – March 2016 issue of Army AL&T.] To date, VLC has hosted multiple competitions to develop FVL technologies and has implemented streamlined processes and single-point contracting to facilitate the rapid development of innovative technologies. (See Figure 1 on Page 112.)

OTA successes include the transition of the National Rotorcraft Technology Center (NRTC) FY15 contracting efforts to the OTA, providing more efficient government program oversight and expanding industry participation. Under the OTA, the NRTC experienced an average cycle time of seven months from proposal receipt to contract award for nine projects in the following technical areas:

- Extreme reliability and structural integrity, and zero-maintenance aircraft systems.
- Airworthiness and rapid certification of complex systems.
- Advanced component design and analysis tools.
- Rotorcraft drive technology.
- Aeromechanics modeling, design and analysis.

On another VLC project, the U.S. Army Aviation Applied Technology Directorate is developing and testing a vibration damping system. Initiated as a proof of concept, the project recently transitioned to a prototype demonstration. It is being performed by a small nontraditional contractor, D-Strut of Scottsdale, Arizona, and is demonstrating how the OTA can reduce acquisition lead time in a competitive environment and shorten the timeline from research and development to fielding.

**Shared investment:** Perhaps the single greatest contribution industry has made early in the FVL program is shared investment. In 2013, AMRDEC awarded four JMR-TD air vehicle technology investment agreements to begin initial design of four objective vehicle concepts that meet notional FVL system specifications. Army and industry partners have invested about \$1 billion in this endeavor, with industry providing nearly two-thirds of the investment resources.

## FVL PATH FORWARD

Beginning in FY16, the FVL initiative began transitioning to a program of record that will develop an aircraft to meet the

requirement of the initial FVL capability set. As the lead service, the Army established a project management office under the Program Executive Office (PEO) for Aviation to lead this development and shepherd the joint participation program through the acquisition process. (See Figure 3.) Key milestones for the first FVL acquisition program are:

- Materiel development decision by the defense acquisition executive in October 2017.
- First flight of JMR-TD in 2017.
- Release request for proposals for technology maturation and risk reduction contracts in 2019.
- Milestone A to enter technology maturation and risk reduction in 2021.
- Milestone B to enter engineering and manufacturing development in 2025.
- Low-rate initial production for the first capability set in 2030.

## CONCLUSION

The DOD FVL initiative established the foundation in requirements development, identification of critical technology needs and acquisition planning. This foundation serves as the basis for successful transition to service-led programs of record to develop and acquire the necessary platforms and architecture to field a fleet of next-generation rotary wing aircraft. Early success of the FVL initiative and related technology development efforts is in no small part the result of deliberate, consistent and enthusiastic involvement of industry. This key element of the FVL initiative strategy will continue in Army and other service-led FVL programs of record to ensure the broadest set of perspectives in identifying innovative and creative ways to achieve affordable programs.

*For more information, contact the Improved Turbine Engine/Future Vertical Lift Project Office at 256-313-2020.*

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# INDUSTRY DAY

## PRESENTING REQUIREMENTS IS JUST THE FIRST STEP

Barbara Machak, then director of the Enterprise and System Integration Center, addresses the 2014 annual DOTC meeting. A two-part agenda, with the government presenting requirements first in a plenary session and industry sharing how it might meet them in smaller closed-door sessions, ensures that the industry day is a conversation, not just a one-way PowerPoint presentation. (Photo courtesy of SCRA)





# OPENS DOORS

When PM CCS began planning for the Gator landmine replacement program, an industry day and a technology consortium led to a wide-open exchange of information and new partnership possibilities.

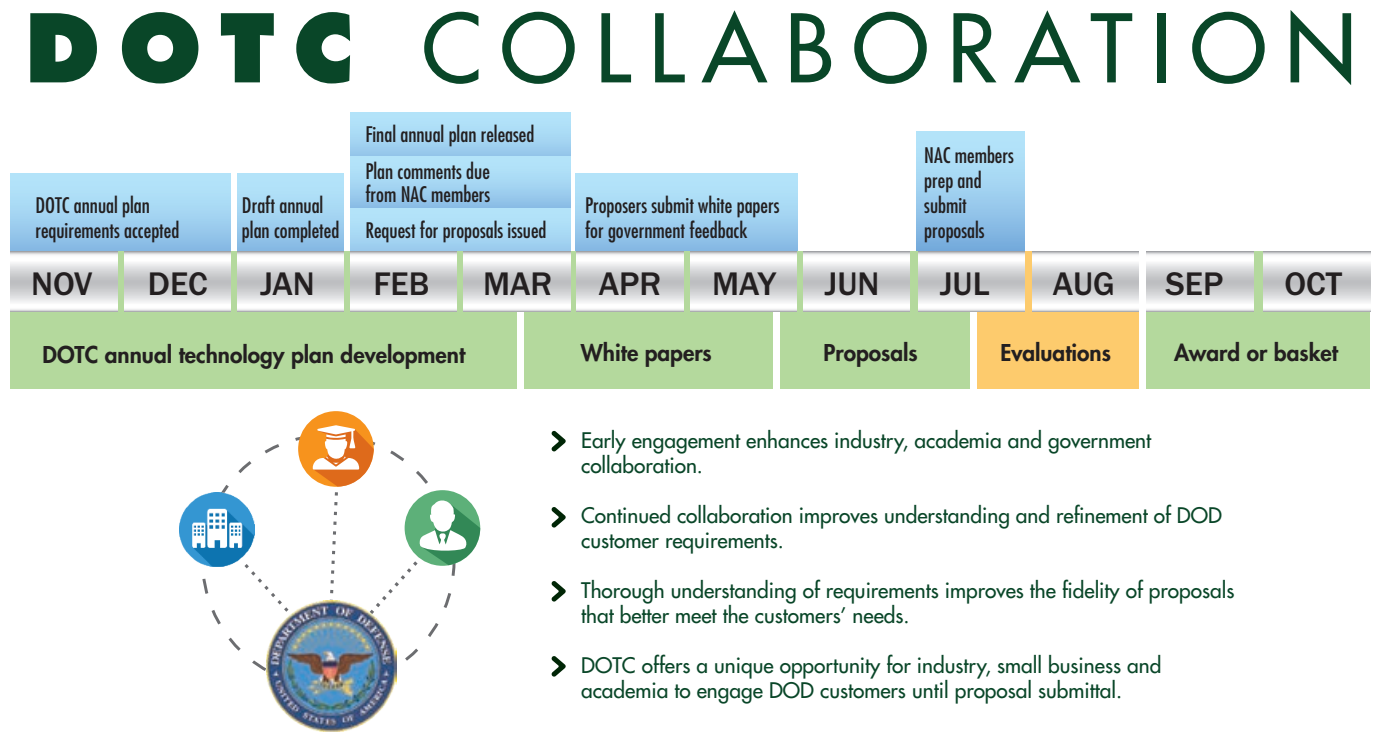
*by Mr. John Troup*

The development of complex weapon systems often involves engaging industry partners early in the acquisition process. When the project manager for close combat systems (PM CCS), under the Program Executive Office (PEO) for Ammunition, began planning for the Gator landmine replacement program last year, it became evident that starting those engagements early doesn't necessarily make things easy. However, a partnership with the U.S. Army Armament Research, Development and Engineering Center (ARDEC) and a technology consortium yielded unexpected benefits that will carry forward into the system development process.

In July 2015, the materiel development decision for the Gator landmine replacement (GLMR) program was approved, initiating the analysis of alternatives (AoA). Months before, PM CCS had recognized how important competitive prototyping—where two or more competing teams develop prototypes during the early stages of a project—would be to conducting a thorough and well-informed materiel solution analysis phase and



FIGURE 1



### THE TABLE WAS ALREADY SET

Working through a standing consortium, the DOTC, PM CCS overcame the difficulties of communicating with industry efficiently before a procurement effort officially hits the street. “Other transaction” agreements already in place through the consortium allow smaller, nontraditional companies and academic groups to join the conversation; and the standing group meeting allowed PM CCS to hold an industry day to discuss the replacement for the Gator landmine without having to supply a location and staff time on nonexistent funds. (SOURCE: DOTC)

AoA. By identifying risks, quantifying affordability and defining development timelines, competitive prototyping leverages the capabilities of industry to inform critical decisions. The logical first step in engaging industry is an industry day.

### FUNDAMENTAL QUESTIONS

In preparing for the industry day, the GLMR team addressed six fundamental questions that would apply to any program planning such an event.

**Why an industry day?** Market surveys, requests for information, or other interactions that don’t take place face to face are an appropriate option in many cases. However, with requirements

this early in development there is the potential for the market survey to result in more questions than answers. An industry day allows for more interaction, collaboration and two-way communication. An ancillary benefit is the ability to gather competitors in the same location. All system contractors rely heavily on subcontractors for specialized capabilities, and with a well-cast net the government can create an environment that fosters networking among the participants and has the potential to result in beneficial partnerships that otherwise may not happen.

**Who is the audience?** The broadest participation possible among multiple sectors of industry offers the best opportunity to capture innovative approaches. In this case, the system could

*To maintain competitive fairness, it was important that information flowed consistently across the board from the government team to the proposing contractors, so it made sense to pull everyone together for another industry day.*

include everything from long-range delivery and communications to non-lethal effects. It is easy to default to the familiar crowd of defense contractors we work with every day, but that's a tall task even for them. A lot of innovation takes place in smaller, more agile companies that may be less familiar to the government team. So the question becomes, how can we reach beyond the standard FedBizOps announcement that may not catch the interest of small and nontraditional businesses?

**What information is being shared?** The requirements, of course.

**But how can you effectively communicate what your requirements are when they are still so broadly defined? How early is too early?** If there is a documented capability need, then it is not too early to start the conversation. It is critical for all parties to understand both the emerging requirements and the realm of the possible so that progress toward providing a capability is effective and efficient.

**When is the appropriate time to conduct the industry day?** The intent is for industry to help identify risks, quantify affordability and define development

timelines. That is information that can feed into the AoA and ensure a well-informed path forward. Hosting an industry day does not commit the government team to anything beyond sharing the approved information.

**How and where are we able to facilitate an industry day within the limited resources and authorities of a pre-materiel development decision effort?**

Setting up an industry day, though it doesn't require substantial resources, can be problematic prior to the program being funded. Additionally, prior to the materiel development decision the government has not committed to even entering the acquisition process. So at this point, we have no money and no commitment to investigate materiel alternatives, but we need data to inform decisions. Fortunately, the only obligation with an industry day is that the government will provide the venue and the information. Unfortunately, even that seemed out of reach in this case.

Most of these questions were easily answered by focusing on the goals of the event: Inform industry of the emerging requirements and gather information on the state of relevant technology. The difficult questions became where and how

such a gathering could be orchestrated before the program officially started.

For the GLMR team, the answers came from an unexpected place.

While developing the acquisition strategy for the competitive prototyping phase, PM CCS identified a promising alternative to the traditional contracting approach: using other transaction agreements through the DOD Ordnance Technology Consortium (DOTC).

The goal of DOTC is to facilitate collaborative government, industry and academic ordnance technology development and prototyping efforts. Industry and academic members of the National Armaments Consortium (NAC), in conjunction with DOD stakeholders such as ARDEC and PEO Ammunition, form the collaborative DOTC organization. With nearly 400 members, of which more than 60 percent are small businesses or nontraditional defense contractors, NAC and DOTC provide an opportunity to engage additional potential developers outside of the traditional partners that have been working with the program manager over the past several decades. (See Figure 1.) Through the use of a single-point contracting process, the time to award can usually be reduced, which is important when trying to get the initiatives up and running in time to be effective at informing the AoA.

DOTC was eager to partner with PM CCS for the competitive prototyping efforts, and the leadership also recognized an opportunity to go above and beyond for their customers while benefiting the membership as well. At the annual NAC general membership meeting, there was time available that could be used for the GLMR industry day. Furthermore, accommodations could



be made for that block of time where there could be an open forum for any interested party, member or not. This would allow ARDEC and PM CCS to announce the event to the public through FedBizOps and give DOTC and NAC an opportunity to engage prospective new members. Many prospective participants would already be on site, reducing travel costs and providing an incentive to stick around and learn about the emerging requirements when they may not otherwise have been interested enough to make the trip.

ARDEC and the DOTC agreed on an event format that would achieve the two primary goals and result in everyone walking away with more knowledge than they started with. The first session, open to everyone, focused on the government conveying the emerging requirements to the full audience. The second, a closed-door session, allowed interested parties to present how they felt they could address those requirements and what the current state of their capabilities were.

When it comes to presenting the material, it can be tempting for the government to go beyond the facts and into conjecture and theories on what exactly the solution looks like. The key is to stick with the facts as they are known and let the audience use its expertise to develop solutions based on the requirements. In this case, the government team focused on the capability gap, characteristics desired by the initial capabilities document and the driving external forces such as policy constraints. The intent is not to answer all the questions participants may have, but to get all the combined experience and expertise in the room thinking about the problem.

Once they hear what the government team has to say, it is up to the representatives

from industry and academia to decide if they have something relevant to the problem worth sharing. The individual sessions provided them the opportunity to demonstrate their interest and capabilities in an “intellectual-property safe environment.” Significantly fewer firms decided to meet with the government team in the individual sessions, which itself is a valuable data point that sets expectations for the future.

### INDUSTRY DAY FIRST OF MANY STEPS TOWARD PARTNERSHIP

Successful partnerships are not built on a single engagement. The industry day is the initial event in a long, collaborative development process. At this stage, requirements are evolving rapidly and the program plan is becoming clearer week by week. Armed with the knowledge shared during the industry day, the interested potential proposers sharpened pencils and started developing their concepts. Meanwhile, the program team continued to build the necessary detail into the competitive prototyping strategy.

Another advantage of the DOTC proposal process that was particularly useful during this stage was the ability for the government and contractor team to collaborate on the development of their

proposal. Collaboration must stop once proposals are submitted, but up to that point cooperation is encouraged to ensure that everyone is on the right path. The beginning of the proposal development period provided a logical point for a follow-on group engagement. (See Figure 2.) The government plan for executing the competitive prototyping phase was further defined, the contractors started pulling together their concepts and teaming between primes and subs had taken place.

To maintain competitive fairness, it was important that information flowed consistently across the board from the government team to the proposing contractors, so it made sense to pull everyone together for another industry day. Having made it through the first industry day, the hurdles faced the second time were minimal, and it was smooth sailing toward awards.

### CONCLUSION

Looking back, the obstacles that appeared to exist really turned into opportunities, which had a ripple effect through the early phases of acquisition. Engaging industry with the assistance of ARDEC, DOTC and NAC opened possibilities that otherwise may not have existed. PM

*The intent is for industry to help identify risks, quantify affordability and define development timelines. That is information that can feed into the AoA and ensure a well-informed path forward.*

FIGURE 2

**DOTC operates under “other transaction” agreements between the government and SCRA/ATI, the acting NAC consortium management firm.**

### Government laboratories



OUSD (AT&L) Land Warfare and Munitions.  
 Department of the Army.  
 Department of the Navy.  
 Department of the Air Force.  
 Department of Energy.  
 Special Operations Command.  
 Other agencies and departments.

### National Armaments Consortium



Major defense contractors.  
 Small businesses.  
 Academic institutions.  
 Nonprofit organizations.  
 Nontraditional defense contractors.



DOTC facilitates collaborative government, industry and academic ordnance technology development and prototyping efforts.

### COLLABORATING AFTER INDUSTRY DAY

An industry day kicks off government-industry collaboration that lasts until proposals are submitted. Working through a consortium, with already established channels of communication, makes it easier to ensure fairness and the equitable flow of information to all potential proposers. The results are less rework and proposals for products that the government actually wants and industry can actually produce. (SOURCE: DOTC and NAC)

CCS and ARDEC were introduced to new sources of innovative technologies that could be leveraged for this initiative and future ones. Partnerships were formed within industry that just needed the impetus of being in the same room. Additional firms, small and large, traditional and nontraditional, were introduced to the opportunities that existed with the competitive consortiums. Those consortiums expanded their membership base and their ability to better serve current and future customers.

For more information, contact the author at [john.r.troup.civ@mail.mil](mailto:john.r.troup.civ@mail.mil) or go to the PM CCS website at <http://www.pica.army.mil/pmccs/MainSite.html>.

<http://www.pica.army.mil/pmccs/MainSite.html>. For more information on DOTC and NAC, go to <http://www.nac-dotc.org/>.

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### HIGHER EFFICIENCY AT LOWER VOLUMES

Welders used on artillery rotating bands at SCAAP are more efficient at lower volumes. This is one of the modernization efforts that will help the facility achieve more competitive pricing when producing lower quantities of shell bodies, not only for government work but also for the wider world market. (Photo courtesy of SCAAP)







# *BOLSTERING the BASE*

The Army and General Dynamics collaborate to help sustain the Scranton Army Ammunition Plant against market and fiscal pressures.

*by Ms. Melissa Markos*

**M**uch has changed since the 15-acre Scranton Army Ammunition Plant (SCAAP) opened in 1951 to manufacture large quantities of artillery and mortar shell bodies, ranging from 105 mm to 8 inches in caliber on high-capacity production lines. Increasing costs from government regulations for antiterrorism and security, environmental protection and emergency management, along with decreased demand for ammunition, have brought the financial viability of the Pennsylvania plant into question.

But SCAAP, the youngest of the six government-owned, contractor-operated (GOCO) plants producing ammunition for the U.S. military, remains a vital asset. The challenge is how to continue operating as a fiscally supportable part of the industrial base.

Addressing that challenge, in collaboration with industry and other government agency stakeholders, is the responsibility of the Office of the Project Director for Joint Services, part of the Program Executive Office for Ammunition.

In the GOCO Army ammunition plants, the government owns all of the property and equipment, and the operating contractor has full use of, cares for, maintains and invests in the facility. SCAAP's current operating contractor is General Dynamics Ordnance and Tactical Systems (GD-OTS).

The strategy developed for SCAAP is an example of the need to balance government-owned industrial base capacity against cost and competitive factors in an environment of declining federal spending.

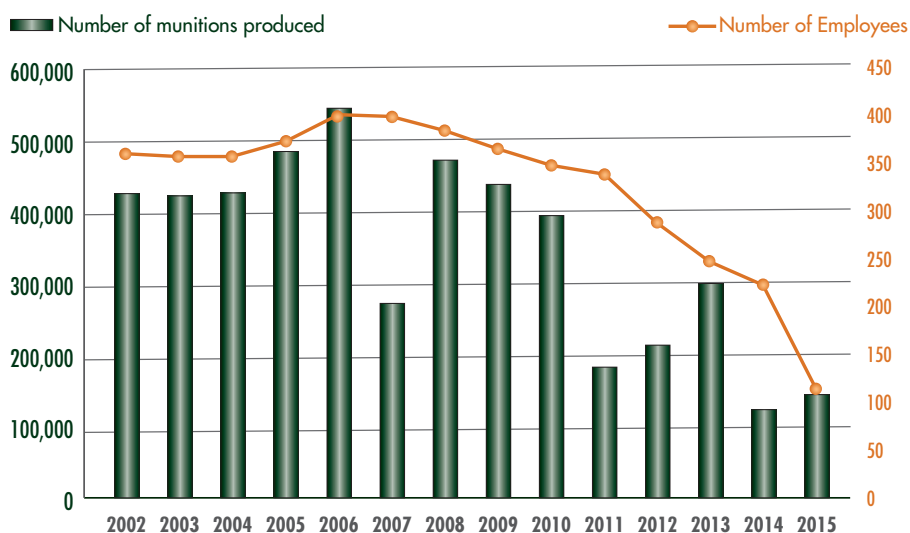
### HIGH COST OF FACILITY OPERATION, MAINTENANCE

The government spells out its requirements for maintenance, care of government property in possession of a contractor, environmental protection, safety, antiterrorism measures and security, and occupational health and industrial hygiene in performance work statements (PWS) as part of the property management contract.

The government does not directly pay the costs of carrying out these facility PWSs. The operating contractor must build the costs into overhead prices for products and services. While each GOCO facility

*As the Army continues to operate under a constrained budget, we need to continually assess what capabilities and assets need to be sustained.*

FIGURE 1



### SCRANTON PLANT'S WANING FORTUNES

As SCAAP's output declined over the past 13 years, so did its workforce, from a high of roughly 400 in 2005 to just one-quarter of that 10 years later. (SOURCE: SCAAP)

is different, most need to compete for production work, including GD-OTS at the Scranton plant. There is no guarantee that government work awarded to the facility will cover the cost to operate it.

When there is a large amount of work at the facility, the overhead is easily shared over many programs. However, as production requirements drop, the programs need to support a larger share of the overhead expense.

Additionally, these facilities, including SCAAP, are built to be efficient at large production rates. When demand for ammunition is low, there is a lot of excess capacity, which may be needed again in the future. It generally costs less and is less risky to maintain that capacity through the lean years than to have to rebuild capacity quickly when needed.

### NOT ENOUGH WORK

The metal ammunition parts produced at SCAAP dropped to a 15-year low in 2014. (See Figure 1.) The number of employees at SCAAP has dropped more than 70 percent over the past decade.

A number of factors have driven this shrinkage, straining SCAAP's financial viability:

- Since the end of the war in Iraq in late 2011, the demand for ammunition has significantly decreased. For example, the demand for conventional 155 mm artillery dropped 75 percent in the years after the end of the war, compared with the previous decade. The 2013 sequestration resulted in a 20 percent cut in the amount of ammunition being procured, further exacerbating the situation.



#### MINIMIZING DOWNTIME

A newly installed cell of computer-numerical controlled lathes at SCAAP is capable of machining multiple types of projectiles with minimal downtime required between changeovers. The lathes were one of \$32.2 million in production base support projects. (Photo courtesy of SCAAP)

- With resource and fiscal restrictions, the Army sought out and implemented innovative cost savings initiatives. One notable effort is the recapitalization of the 155 mm Dual-Purpose Improved Conventional Munition (DPICM) and 105 mm M1 projectile bodies. The Army is disassembling DPICM rounds that are designated for demilitarization and using the artillery projectile bodies for a new extended-range round. The Army is also recapitalizing a large volume of M1 rounds each year at the government-owned, government-operated Blue Grass Army Depot in Kentucky and McAlester Army Ammunition Plant in Oklahoma, which are reusing the projectile bodies. While saving the Army about \$65 million annually, these cost-saving strategies also reduce the requirement to produce new artillery projectile bodies at plants such as SCAAP.
- Another fundamental cost-saving strategy employed by the Army is to award production contracts competitively where possible. In 2012, a competing facility won a five-year contract for 120 mm mortar shell bodies that SCAAP historically had built. With the reductions in demand for other types of artillery and mortar bodies, GD-OTS proportioned more of the cost burden from the government regulations into its overhead price for the 120 mm, leaving it unable to provide a competitive price. Losing the 120 mm work further stressed SCAAP's financial situation.

#### SURVIVING THE DROUGHT

One way the government can support GOCO facilities is by reducing the requirements it places on them while ensuring the necessary care and maintenance of the facilities.



In June 2013, the Office of the Project Director for Joint Services, the Joint Munitions Command and GOCO operating contractors formed a tiger team to review and reduce PWS requirements to the minimum necessary to run the GOCO facilities. The team evaluated every requirement, from how many guards need to be at each gate, to the number of boiler inspections each year, and compared the requirements against commercial best practices. It was a difficult process and significant changes were closely scrutinized because of the importance of security; the need to ensure that government property is maintained; and ensuring that Occupational Safety and Health Act environmental and safety laws were met. SCAAP's next property management contract could save 5 percent in overhead costs, although new cybersecurity requirements may eat up those savings.

At the same time, GD-OTS carried out several rounds of layoffs. The workforce went from an average of 350 employees (between 2002 and 2012) to 150 in 2015. The company also negotiated with its employees to gain greater flexibility in job assignments, allowing one operator to work on various equipment and operations. These measures contributed significantly to the company's ability to reduce overhead rates at SCAAP.

A more obvious solution—to bring more work to the Scranton plant—has proved difficult for both the contractor and the government. The government encourages operating contractors to solicit work for the commercial market or to lease unused facilities to tenants as a way to reduce facility overhead, and GD-OTS has been able to bring in commercial work, which sustained the facility through 2015. However, that market is very volatile and not reliable as a sustainment strategy.

*One way the government can support GOCO facilities is by reducing the requirements it places on them while ensuring the necessary care and maintenance of the facilities.*

GD-OTS's capabilities are so specialized that many of the markets they serve are opting for foreign imports.

Another commonly argued strategy, for the government to direct workload to government-owned facilities, theoretically ensures that they have sufficient workload to cover maintenance costs and retain critical skills. However, this approach works against commercial facilities with the capability to make the product as well as the government's ability to obtain competitive pricing.

In 2014, there simply was not sufficient ammunition production work available to cover the overhead costs, even if the Army directed all of it to SCAAP. The Army could not terminate the 120 mm mortar shell body contract with another supplier and direct those orders to SCAAP in a timely manner. The 155 mm DPICM program was supporting both the Blue Grass and McAlester facilities, as well as saving the government significant money. As it was, the procurement requirements for 155 mm artillery were at a 15-year low.

#### **A STRATEGY FOR SURVIVAL**

In October 2013, the government and GD-OTS developed an enhanced strategic plan for SCAAP to address the key manufacturing processes that were

the least efficient at low production volumes and propose flexible manufacturing cells that would be more efficient at lower volumes. In FY14, the government awarded GD-OTS \$32.2 million in production base support projects to execute the strategic plan. The modernization projects included the installation of flexible rough and finish turning lines, batch heat treat systems, and local boilers for specific processes. These low-volume, higher-efficiency production lines will be completely installed and operational by the end of FY16. These modernization efforts will allow SCAAP to achieve more competitive pricing when producing lower quantities of shell bodies, not only for government work but also for the wider world market.

In FY17, the government intends to compete the property management contract for SCAAP. To level the playing field and entice competition for the facility, the government purchased GD-OTS's intellectual property related to production in the facility and plans to provide it to the successful offeror. Additionally, the government will award a 10-year production contract for artillery projectiles and mortar shell bodies in conjunction with the property management contract. To help ensure government work at the facility, both contracts will be under one

solicitation, awarded to one contractor. Another feature of the upcoming property management contract allows the operating contractor to lay away portions of SCAAP, or even the entire facility, while preserving it to satisfy future DOD surge requirements for artillery and mortars. This will give the contractor the flexibility it needs to be efficient, while giving the government the assurance of surge capacity available when needed.

## CONCLUSION

As the Army continues to operate under a constrained budget, we need to continually assess what capabilities and assets need to be sustained. For those required in the future, new business models should be explored to allow operating contractors maximum flexibility to adjust to the inevitable ebb and flow in ammunition demand, while providing the government the assurance it needs that ammunition production will be ready when needed. SCAAP serves as a case study in utilizing new methods to preserve large production capacity for surge.

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## MAINTAINING THE AMMO SUPPLY

A cannon crew member with 7th Infantry Division, Joint Base Lewis-McChord, Washington, prepares 155 mm artillery shells during a combined arms exercise in February at Yakima Training Center, Washington. Upgrades and modernization at SCAAP will keep the ammo coming, even during periods of relative peace. (U.S. Army photo by Sgt. Cody Quinn, 28th Public Affairs Detachment)



## MODERNIZING THE PLANT

These newly installed batch heat treat ovens are more efficient than large ovens when running smaller quantities of product. This is one of the modernization efforts that will help SCAAP to achieve more competitive pricing when producing lower quantities of shell bodies. (Photo courtesy of SCAAP)



## THE YEAR OF THINKING CRITICALLY

CGSC, at the Lewis and Clark Center at Fort Leavenworth, Kansas, became the crucible in which the author's new understanding of his career and goals was forged. (Photo courtesy of CGSC)





# ADVOCATE *for* INNOVATION

Ordered to attend the yearlong resident course at CGSC, an acquisition officer thought his career advancement was totally derailed. Instead, the course was life-altering, providing unexpected insight—and a determination to change the status quo in acquisition.

*by Maj. Andrew Miller*

**M**y first reaction, when I saw that I'd been selected to attend the yearlong resident course of the U.S. Army Command and General Staff College (CGSC) in 2015-16, was that it made absolutely no sense to send me. I was one month into my first acquisition assignment and would have to leave my project office after a year. Additionally, I was living on Fort Belvoir, Virginia, and could have attended the four-month satellite course, remained in my position and saved the government the costs of moving me to and from Fort Leavenworth, Kansas.

Acquisition officers access into (that is, assume duties in) Functional Area 51 as branch-qualified captains. As such, we have limited time to complete the professional requirements necessary to compete for command. For that reason, and in light of the operations tempo associated with the war on terrorism, acquisition officers traditionally have attended the four-month satellite CGSC course.

In 2014, the Acquisition Corps, in conjunction with the U.S. Army Human Resources Command (HRC) and the CGSC leadership, changed this policy and opened the year-long resident course to its officers. This had a dramatic impact on my career plans and sparked concerns as to whether the benefits of the course were worth the significant investment of time.

I articulated my preference to defer to the satellite course to my chain of command and HRC's Acquisition Management Branch. Attending the resident course robs us of a year in which to work toward Defense Acquisition Workforce Improvement Act certifications and compresses our career development timeline. As such, the cost of resident CGSC is often the opportunity for the Advanced Civil Schooling or Training with Industry programs. But the most powerful argument against attending resident CGSC is that very little of the course content relates directly to the acquisition career field. Arguments aside, in June 2014 my commander denied my request to defer.

### NEW WAYS OF THINKING

I entered CGSC with an open mind but low expectations. I assumed that the course was focused on operational issues, and I intended to complete it and get on with my career. I envisioned endless PowerPoints, rote memorization of doctrinal principles and toilsome planning exercises. Looking back on the course now after finishing in June, I see how wrong I was. In this one short year, I learned more about myself, my peers (and people in general) and my profession than I would have in five years assigned to a project office. Resident CGSC was invaluable to

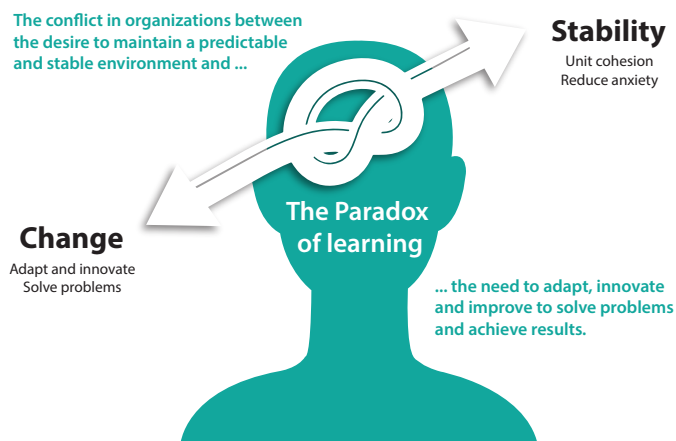
my career and personal growth and is unequivocally a worthwhile investment for the Acquisition Corps.

Through life experience and deliberate self-reflection, my self-awareness and critical thinking skills have grown steadily. CGSC accelerated this personal growth by providing a critical thinking laboratory that mixes students from all branches of the Army with officers from other services, government agencies and allied nations. Led by an equally diverse cadre of instructors, these groups addressed extremely complex, real-world issues that forced many students to re-evaluate their ways of thinking.

I tend to be a divergent thinker—one who attacks problems in a nonlinear fashion and from many different viewpoints. This allows me to appreciate the complexity of most situations but rarely facilitates an easy or timely decision. As such, I have come to envy decisive people, whose way of thinking spares them the agony of grappling with masses of seemingly small details. However, by digging to the root causes of complex issues, I have come to grasp the importance of the shades of gray that exist in almost any situation.

Additionally, through a year of discussions, I developed a deeper respect for how people's personalities and thinking styles influence their approaches to problem-solving and the conclusions they eventually reach. In short, I am a more critical, deeper thinker than I was when I started CGSC.

FIGURE 1



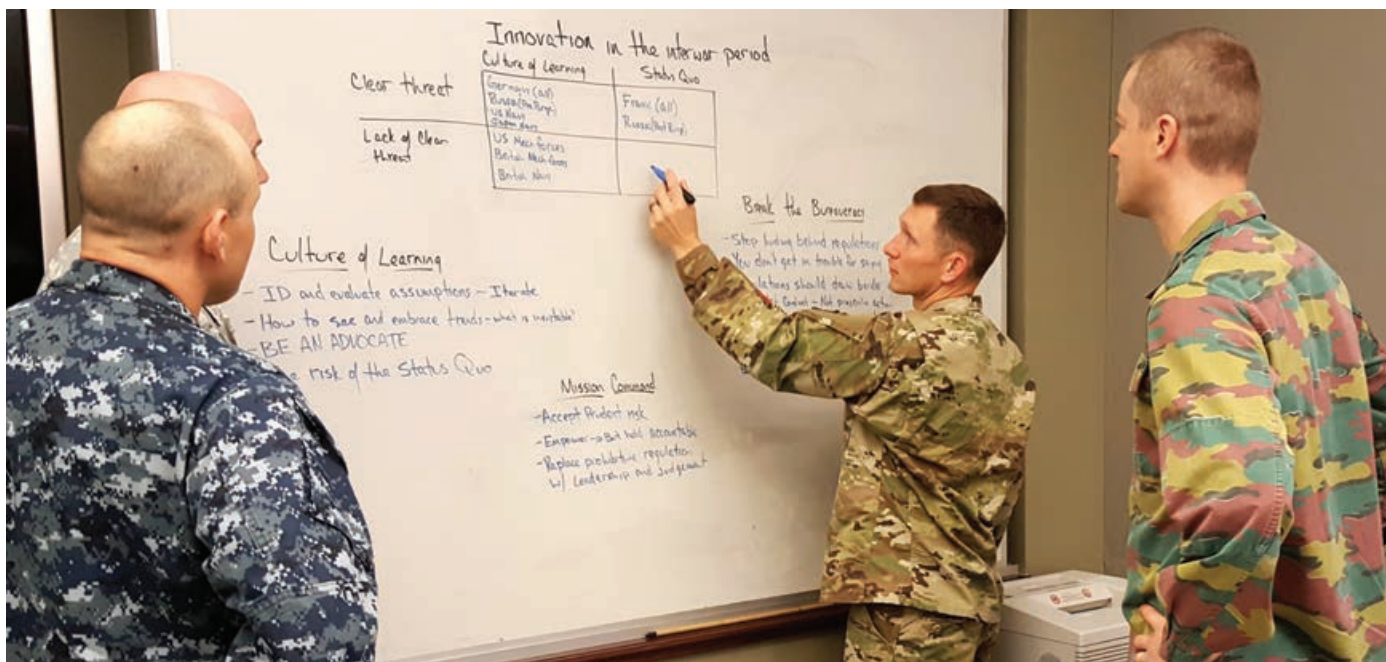
### CREATIVE TENSION

One of the topics that CGSC students tackle in depth is organizational culture and change—for example, the inherent conflict in organizations between preserving a predictable, stable environment and the need to solve problems and achieve results. (SOURCE: CGSC Department of Command and Leadership)

### THE BIRTH OF AN ADVOCATE

The realization that CGSC would influence my thinking profoundly did not come quickly or deliberately. Instead, the seemingly unrelated pieces of knowledge that would enable me to make this connection accumulated gradually as I navigated the coursework. It all came together during the course's final tactics planning exercise. As my small group discussed the scenario, someone suggested that we communicate with the population to help it accept the inevitability of its new reality. I agreed and added two points from previous blocks of instruction, noting that populations that identify and embrace the inevitable are more likely to innovate, and that to create lasting change in a population, you have to address its culture.

The discussion moved on—but I did not. The simple act of applying principles from other classes to the scenario at hand set off a chain reaction in my head. For the first time, I grasped the potential that these ideas held. By combining the principles of organizational change management, the mission command philosophy and historical context as it relates to innovation and



### INGREDIENTS OF INNOVATION

The author, center, works with fellow CGSC students—from left, U.S. Army Maj. Brent Adams, U.S. Navy Lt. Cmdr. J.J. Murawski and Senior Capt. Rik Van Hoecke of the Belgian army—to identify conditions necessary for innovation. (Photo by Maj. Karen Daigle)

*We have implemented a system in which numerous individuals have the incentive to say no, but very few have the authority to say yes.*

culture, I changed my view of the Army's acquisition system. Before attending CGSC, I saw the system as a rigid, uncaring behemoth whose complexity made it impervious to change. I now realize that although large and resistant to change, the Army's acquisition system is dynamic, open to influence and a direct reflection of the people who contribute to it.

My former perspective on the system led me to define success by how well I could navigate my projects through its complex maze. I now see that project managers have a dual responsibility. In addition to ensuring project success, we have a responsibility to improve the system by seeking out and implementing efficiencies within our control and by providing honest feedback to address systemic issues outside our jurisdiction. We do not have to accept the system's faults. Instead, we

can involve ourselves in the process to confront roadblocks to innovation.

### MANAGING CHANGE

Of all the lessons that left an impact, the discussions on organizational change management (OCM) most directly challenged my views on the acquisition system. OCM is a discipline that examines the behavior of organizations and the individuals within them from an analytical framework to examine and affect the change process, and is a focus of CGSC. I had been exposed to OCM while studying for my MBA in 2012 but had an incomplete understanding of its application.

I initially saw OCM as a way for organizations to react to major changes in their environment or deliberately improve performance. In my view, OCM was a



discrete process that you initiated when faced with a big change and terminated when the transition was complete.

CGSC validated the importance of OCM in managing big changes. However, it also showed me the impact that iterative OCM has on an organization. By conducting continual assessments of its environment, updating its vision and communicating clearly, an organization can address change incrementally and is more likely to innovate and succeed.

The successful output of OCM is almost always a modified culture. And in our business of problem-solving and innovation, we should strive to cultivate a culture of learning. CGSC characterizes “learning organizations” as those that “foster a culture of learning that solves problems and improves the organization through a supportive command climate [while] valuing member involvement.”

CGSC’s lessons on culture and learning organizations allowed me to develop a more accurate understanding of the relationship of organizational culture, critical thinking and productivity. Looking back on my 11 years in the Army, I recognize that I have been in both learning organizations and organizations that clung to the status quo. Although I did not realize why at the time, the learning organizations performed better and provided a more rewarding work environment by empowering team members to influence the organization’s direction.

Unfortunately, learning organizations do not form by accident and are not maintained without considerable effort. This is true because of an ongoing struggle between the change inherent in a learning organization and the predictability and comfort associated with the status quo. (See Figure 1, Page 130.) Armed

with this understanding of productive cultures and techniques for influencing them, I hope to participate more actively in shaping the culture of my future organizations.

### MISSION COMMAND

During CGSC, I also came to appreciate and understand the principle of mission command. As defined in Army Doctrine Publication 6-0, mission command is “the exercise of authority and direction by the commander using mission orders to enable disciplined initiative within the commander’s intent to empower agile and adaptive leaders in the conduct of unified land operations.” By far the clearest definition of mission command I’ve ever found comes from author and blogger David Hurst: “The idea of mission command [is] to set boundaries, to bracket the options and to create spaces where everyone from the highest general to the lowliest enlisted man [has] discretion to act in the interest of achieving the overall mission.”

Before CGSC, I had a basic understanding of mission command, but saw it more as a rebranding of command and control. Now, I not only grasp the effectiveness of mission command but am a strong advocate for it.

Unfortunately, I also see how ineffective the Army has been at implementing

mission command, particularly where it involves prudent risk. This is especially true in the Acquisition Corps. We operate under federal regulations as well as DOD and Army policy that require centralized authority at the highest levels. Additionally, regulation and policy distribute the authority not held by senior officials to a multitude of organizations, often with conflicting interests. Over time, we have attempted to eliminate risk, but instead have allowed rules and policy to take the place of leadership and judgment. We have implemented a system in which numerous individuals have the incentive to say no, but very few have the authority to say yes.

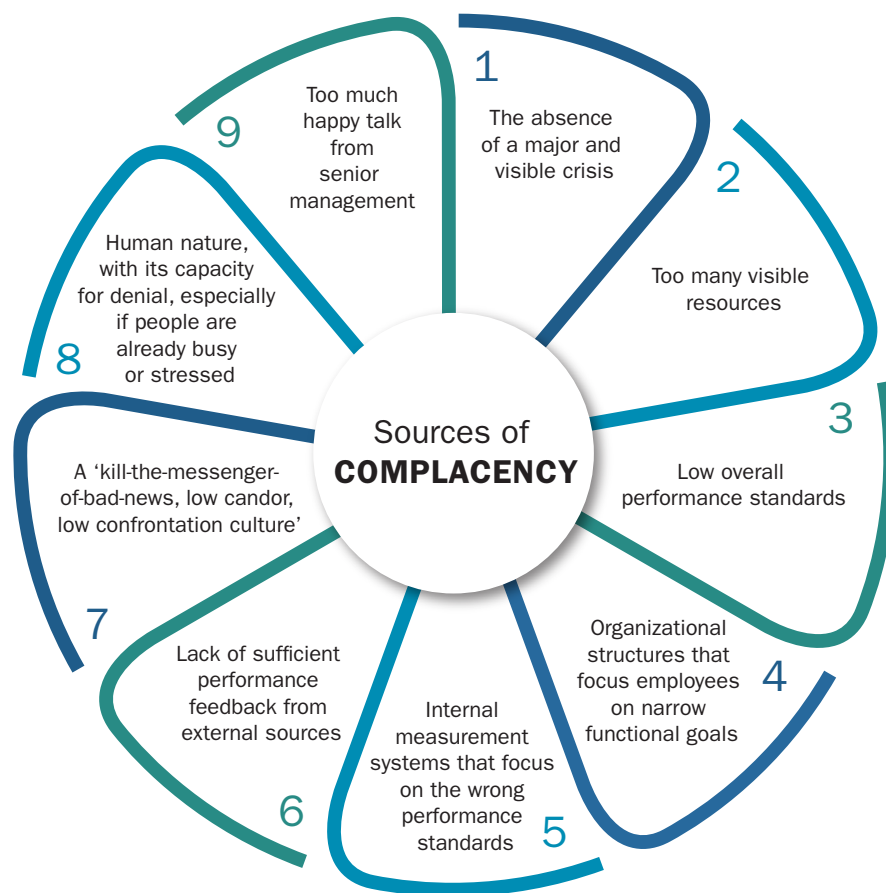
### HISTORICAL CONTEXT

In addition to grappling with issues of culture and mission command, we spent a significant portion of the resident course discussing innovation. We studied military innovation from the general staff of Frederick the Great to the American Army’s Cold War-era AirLand Battle doctrine. (Frederick II, king of Prussia from 1740 to 1786, made Prussia the major European military power of the era. His major contribution was the development of the general staff, whose existence and structure form the foundation of modern military staffs.)

We focused on the bold innovations that propelled insignificant actors to world

*I now realize that although large and resistant to change, the Army’s acquisition system is dynamic, open to influence and a direct reflection of the people who contribute to it.*

FIGURE 2



### SUPPORTING THE STATUS QUO

Dr. John P. Kotter, chairman of Kotter International, a management consulting firm, and an international leader in managing change, cautions that in any major change effort, "Never underestimate the magnitude of the forces that reinforce complacency and that help maintain the status quo." (SOURCE: CGSC Department of Command and Leadership)

power status and identified the common factors behind these transformations: a culture of learning, political support, a clear threat and passionate advocates. We then dissected the situations that caused the powers to move away from innovation, stagnate and eventually shrink in power and influence.

The period of peace between World War I and World War II clearly illustrates the dichotomy of the status quo versus innovation. Before World War II, Germany was a defeated power, stripped of the materiel and financial and political ability necessary to raise an army. Despite these constraints, it was also the only nation that combined the commonly available technologies of radio, radar and mechanization to revolutionize land warfare.

In the early interwar years, the learning culture of the German army drove its military innovation. It honestly and openly analyzed the factors that contributed to its defeat in World War I, conducted small-scale operations to test various doctrine and equipment, and empowered advocates to explore emerging opportunities. As World War II drew closer, the Germans' earlier innovations coalesced with a clear threat and increased political support, resulting in a redefinition of land warfare.

Compared with Germany, the rest of the world's interwar innovation fell short. France is the most direct contrast. A victor in World War I, France should have had all the pieces necessary for innovation. As World War II loomed, France had a clear enemy and political support. However, it distinctly lacked a learning culture and failed to acknowledge the changing environment. France suppressed criticism of its performance in World War I and built a strategy on fixed assumptions related to static defense. Additionally, it

marginalized would-be advocates and, as such, became mired in the status quo. France's obstinate refusal to adapt led to its resounding military defeat and subsequent occupation by Nazi forces.

Nazi Germany's rise to power was short-lived, however. As much as innovation defined its conquest of Western Europe, adherence to the status quo contributed to its failure in Russia. The tactic of blitzkrieg, which worked so well in the West, failed to achieve the same effects

against the Soviets. The vast distances of the Russian countryside negated the Germans' advantage and denied them an early decisive battle. Unwilling to abandon their proven tactic, the Germans vainly attempted to outflank the displacing Soviets until their supply lines could no longer support extended operations. Had the Germans critically evaluated the continued use of blitzkrieg, they likely would have modified their tactics and potentially changed the course of the war.

FIGURE 3



### MAKING CHANGE HAPPEN

In changing organizational culture, unresolved problems often require leaders to impose new values and beliefs to modify a group's norms and values. (SOURCE: CGSC Department of Command and Leadership)

### CONCLUSION

I fear that, like many of history's most formidable armies, the U.S. Army may have become too comfortable with its own status quo. We have an unchallenged advantage in the world, lack a clear threat and have critically low political support. (See Figure 2, Page 133.) The zero-defect environment of personnel draw-downs discourages career Soldiers from questioning assumptions or campaigning for change outside of their organizations.

In the Acquisition Corps (and the greater materiel development community), the status quo translates to sequential development. A project manager with an approved acquisition program baseline has little incentive to collaborate with capability developers and users. Instead, it is in the project manager's best interest to guard against changes, ignoring emerging requirements and changing environments. Even innovation-minded project managers have trouble breaking the sequential development cycle. The dilution of authority among the numerous organizations involved in the materiel development process almost guarantees a misalignment of interests and an inability to vigorously evaluate assumptions.

The Acquisition Corps further incentivizes the status quo by evaluating acquisition professionals based solely on cost, schedule and performance within their functional roles. This stifles

innovation, offers no incentive for collaboration and makes the process more important than the product. Many of our industry partners address sequential development by building cultures that prize collaboration. Although their approaches vary, many companies have created product development teams assembled from across the organization. These teams define project goals and have the power to make decisions throughout the development process. (See Figure 3.)

Additionally, many organizations address the misaligned incentives created in evaluating project managers solely against their program baselines by conducting a more subjective performance assessment that balances overall project success and stakeholder collaboration with the more traditional cost, schedule and performance metrics.

Without realizing it, I spent the first nine months of CGSC building the vocabulary and passion to address issues that I had previously struggled to articulate. I do not pretend to have a comprehensive grasp of the issues we face, much less a solution to the Army's innovation issues. Nor am I arrogant enough to think that any connections I have made are original thought. However, because of my experience in CGSC, I now see that I can add value to the Acquisition Corps, not just by working diligently on programs within my sphere of control, but also by advocating for innovation throughout my sphere of influence.

*For more information on opportunities for Army acquisition officers to attend CGSC, contact Maj. Isaac Torres, 51C proponent officer at the Army DACM Office of the U.S. Army Acquisition Support Center, at [isaac.m.torres.mil@mail.mil](mailto:isaac.m.torres.mil@mail.mil) or 703-805-1249; or go to the HR Command's Acquisition Management Branch webpage at <https://www.hrc.army.mil/OPMD/MAJ-CPT%20Assignments>, or the Army DACM Office webpage at <http://asc.army.mil/web/career-development/military-officer/career-planning-steps/>.*

*For more on CGSC and its curricula, go to <http://usacac.army.mil/organizations/cacelcgsc>.*

*MAJ. ANDREW MILLER, a graduate of the 2016 CGSC resident course, is now an assistant project manager assigned to the project manager for Soldier Warrior in the Program Executive Office for Soldier. He holds an MBA from Southeastern Louisiana University and a B.S. in marketing from Louisiana State University. He is Level II certified in program management and is a certified Project Management Professional.*



# BEEN THERE, DONE THAT

Do you trust that the multimillion-dollar program you just took over is ready for you to sign off on the APB? Or should you first take the time to do a 'deep dive' into the work of your government-contractor team? It's the kind of decision that represents the price of ownership for a program manager.

*by Col. Raymond D. Jones (USA, Ret.)*

*Most of the time when people say, "Been there, done that," they probably haven't. To say that the former program managers who will be writing this new series of insightful columns have been there and done that is not a boast but an understatement. We at Army AL&T magazine marveled at our good fortune when the Naval Postgraduate School (NPS)—specifically Senior Lecturer John T. Dillard, a retired Army colonel, academic area chairman for systems acquisition management and himself a former program manager at multiple levels—approached us with the idea of a series of lessons-learned articles by former O-6 project managers who teach at NPS.*

*The depth and breadth of experience among the NPS acquisition and business school professors provide practical insights into managing programs at all levels in the Army as well as the joint environment. Additionally, their insights into the commercial business sector support critical analysis and interpretation of the processes and challenges of executing Army programs. Their understanding of the business of DOD acquisition provides students with a strong foundation from which to better lead Army programs to success and meet the needs of Soldiers on point.*

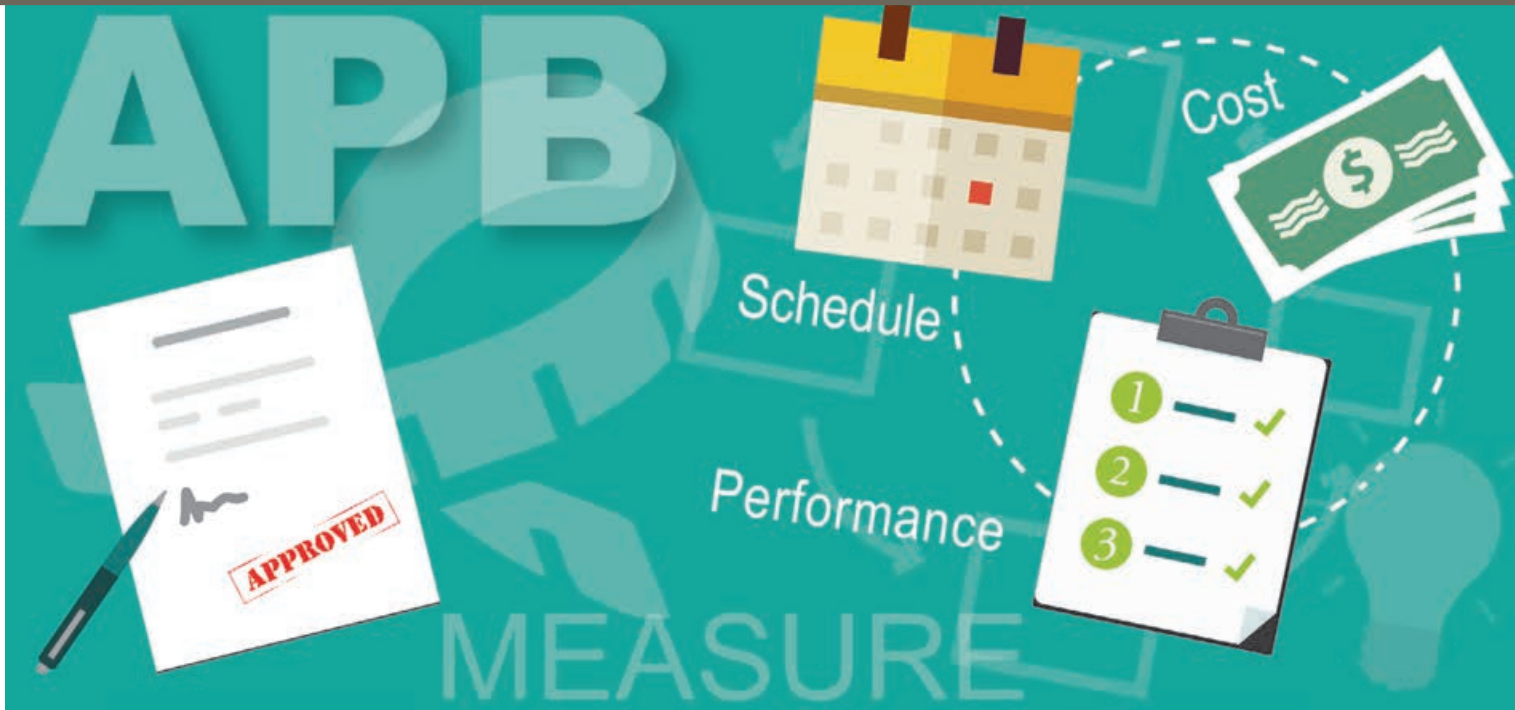
*We intend this series not to be quarterly statements of fact, but quarterly conversation starters. Yes, these folks have been there and done that—but maybe you have, too. We hope you will feel free to raise your hand and jump right into the conversation. Please send us your feedback to continue the discussion.*

*Second in a series of quarterly commentaries by former program managers from the Naval Postgraduate School.*

Congratulations, you have just been selected as a project manager (PM) by the most recent Centrally Selected List annual board for command and project manager assignments. Your assignment is to take over a program critical to the network infrastructure for the Army Battle Command System, a digital command, control, communications, computers and intelligence (C4I) program. Your program includes a mix of fixed, semifixed and mobile networks. It also is designed for interoperability with U.S. and coalition C4I systems.

The project has just passed its Milestone B (MS B) review, followed by a contract award to the most capable contractor in the competition. Inherent in this approval is that the Milestone Decision Authority (MDA) certified to Congress that the program met the requirements of 10 U.S. Code 2366(a), which mandates that:

1. The program fulfills an approved Initial Capabilities Document.
2. There is a plan to reduce the risk.
3. The program addresses planning for sustainment.
4. The program officials have submitted a cost estimate to Congress reflecting a fully funded program through its retirement.



#### HIGH-STAKES RESPONSIBILITY

After a program has passed MS B, the APB is the first and perhaps most important acquisition document that a PM must produce. It shows the program's current condition in terms of threshold and objective values for the cost, schedule and performance requirements, and the PM who signs the APB is taking full ownership of the program in all its good and bad aspects. If something goes wrong, DOD and Congress will look to the PM. (All images courtesy of the U.S. Army Acquisition Support Center)

Given the rigorous process of source selection and the statutory requirements of certifying programs to Congress, what could be better than assuming the reins of a program that is clearly destined to be successful? After all, you are now in charge of a multimillion-dollar program that is certified as Technology Readiness Level 6, is fully funded in the budget and has a capable contractor to execute the work.

#### HOW TO PROCEED?

After the excitement of receiving such a distinguished and important responsibility, a measure of recognition by your leaders and peers, you ask yourself, in a moment of reflection, "How are we going to do this?" Clearly the program is postured for success, or it would not have passed the MS B review. Yet nothing can be all silver linings. There have to be clouds.

At this point, the institutional machine starts up, and the process requirements begin to hit your inbox. The first and perhaps most important acquisition document you must produce is the Acquisition Program Baseline (APB), and the institution wants to know when you are going to deliver it.

As you are well aware, the APB, developed by the PM, depicts the current condition of a program. You're also well aware that, as the PM, once you set the baseline by signing the APB, you own the program and any problems. The APB states the threshold and objective values for the cost, schedule and performance requirements and needs MDA approval. The APB is the document that DOD and Congress use to measure the success or failure of your program—how well it is managed to cost and schedule objectives.

At this point, and with complete confidence, you could ask your director for acquisition to create the APB for your signature, based upon the results presented at the MS B decision and the proposal presented by the winning contractor. You could also pause and ask yourself, "How confident am I in the contractor and their proposal?" After all, how well do you know the team of government and contractor employees assigned to the program? Are you willing to bet the program's future, with perhaps millions of taxpayer dollars at stake, on the results of assorted organizations' hard work leading up to MS B? Or do you need to take the time for a "deep dive" into the challenge in front of



### A COMMON UNDERSTANDING

Before signing the APB, it is advisable for a PM to conduct an IBR. If the APB is the most important acquisition document that a PM must produce after the MS B decision, the initial IBR is perhaps the most important post-MS B meeting in the life of a program. It can go a long way to cement a common understanding among the government and contractor personnel of program requirements and resources.

you and establish your own effective relationship between your program office and your contractor teammates?

### SETTING THE BASELINE

In another moment of reflection, you decide not to take the greased-skids route that appears to be laid out before you. That's because you know that, historically, DOD has a mixed record of getting it right from program start to first-article delivery. At some point, programs depart from cost and schedule expectations, leading to a new program baseline, restructuring or, ultimately, termination. All too often, one of the root causes for this worst-case outcome is a poor relationship between the government and contractor based upon misaligned or unrealistic expectations.

For example, the level of risk in executing the program can vary wildly between the government and the contractor, leading to conflict and disagreement early in the program life cycle. Both the contractor and government leadership must align their expectations of risk to have any hope of succeeding.

Instead of producing an APB document immediately, you decide first to have what is perhaps the most important meeting in the life of a program, the initial integrated baseline review (IBR) after the MS B decision. While you deeply respect the efforts of those who brought the program to this point, and you have confidence that the source selection process chose the right contractor, you are not entirely convinced that all concerned fully understand the program. You want reassurance that the contractor and the government team view the program requirements through a common lens. This requires that you understand all aspects of the program by applying a systems engineering analysis in which requirements are decomposed for better clarity and

resources are allocated against those requirements. Only then can you truly establish an effective, high-performing relationship between government and contractor.

### BUILDING THE RELATIONSHIP

The initial IBR allows you and your contractor teammates to better understand the requirements for the program, ensure proper allocation of the resources across the work breakdown structure (WBS) and reach a common perspective on the program risks—in effect, to officially begin your execution of the program from a common starting point.

This review also allows you and the contractor team to better understand each other and establish a collaborative relationship based on professionalism and trust rather than intimidation and suspicion. It gives you an opportunity to assess any gaps in planning or overly enthusiastic decisions that may have been made in the run-up to the MS B decision. In effect, it is the first point at which you, as the PM, can fix deficiencies in program planning, either on the government side or in the contractor's proposal.

It is also the first opportunity in the program for you and your contractor counterparts to truly dig into the details and determine if you can actually execute the program in accordance with the contractor's baseline reflecting actual program resources, in lieu of program cost estimates and contractor proposals. You are effectively validating how the contractor allocated the program



### ONE TEAM, ONE GOAL

It's not just the specifics of an acquisition program—the funding, the vendor's track record, the technology readiness level, etc.—that posture it for success. It's also the relationship between the government personnel, led by the PM, and the contractors assigned to the program. Developing a collaborative, trusting, high-performing relationship takes time and clear, open communication on goals and expectations.





#### ALL SYSTEMS GO

After ensuring a careful review and a common understanding of requirements, resources and risk, a PM can be confident in signing the APB and look forward to a successful program that demonstrates sound project leadership.

resources across all levels of the WBS. This will ensure that you are adequately accounting for program risks at every phase of the life cycle.

For major programs, you have four to six months after the MS B contract award to get control of your program or recommend a change if you are not satisfied with the potential for successful execution. Even a recommendation to terminate is an option at this point; in fact, it is your responsibility to do so if your detailed program review suggests that the program simply cannot be executed. Obviously this is not the desirable outcome. Your experience has shown that it is better to set the program up for success early than to expend resources on a program destined for failure. So, based on your IBR, you establish a performance baseline with your counterpart that is well understood and mutually agreed upon. Thus you can ensure clear, effective communications and an environment of trust based on a common understanding and expectations.

#### CONCLUSION

Congratulations, PM! You have just completed the IBR for your Army Battle Command System program. You have determined, after detailed review of the requirements, the resource-loaded baseline and the risks, that this program is poised for success.

You have established a good working relationship with your contractor counterpart and, in doing so, have demonstrated the

leadership necessary and expected by the Army and the nation, the very attributes that got you selected to be a project manager.

You and your contractor running mate are now in absolute alignment on the program expectations; you understand the organizational and programmatic challenges ahead and are ready to produce this capability on time and on budget. You sign the APB, set the performance measurement baseline and proceed to your next most important meeting, the critical design review. Good job!

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*COL. RAYMOND D. JONES (USA, Ret.) served in the Army for nearly 30 years and is currently a lecturer with the Graduate School for Business and Public Policy at the Naval Postgraduate School (NPS) in Monterey, California. His final assignment in the Army was as the deputy program executive officer for the Joint Tactical Radio System in San Diego, California. He has twice served as an Acquisition Category ID program manager and has had multiple operational and acquisition-related tours. He is a 1995 graduate of the U.S. Naval Test Pilot School with multiple flight test assignments. He has an M.S. in aeronautical engineering from NPS, an MBA from Regis University, an M.S. in national resource strategy from the Industrial College of the Armed Forces and a B.S. in aerospace engineering from the United States Military Academy at West Point.*



# MODERNIZATION *by the* NUMBERS

The head of SoSE&I's Capability Package Directorate reviews the evolution of the Network Integration Evaluation and the Army Warfighting Assessment and offers suggestions for changes to get better materiel to warfighters more quickly.

*by Col. Terrece B. Harris*

“People don’t know what they want until you show it to them.”

Although Steve Jobs, the late founder of Apple, has been credited with many insightful quotes, this has to be one of my favorites—and one that definitely applies to the Army’s modernization processes.

For purposes of this article, substitute “Soldiers” for “people.” This is not to say that Soldiers don’t have a good idea of what technologies are required for their operational missions. However, this statement has been continuously validated through the years, most recently through the Network Integration Evaluation (NIE) and Army Warfighting Assessment (AWA) construct.

While serving as director of Capability Package for the System of Systems Engineering and Integration (SoSE&I) Directorate, I have heard warfighters voice concerns that a particular system does not meet their requirement expectations and should

not have been fielded. In the same discussion and venue, I have heard the system’s project managers argue that their product met all approved user requirements and should be fielded. After assessing both positions from an objective perspective, all have valid points and are respectively correct.

The NIE process was designed to bring the acquisition, requirements and test communities together in an operational environment to alleviate stove-piped development and incorporate user feedback. It has succeeded in facilitating Soldier-driven design and integration improvements, which has yielded lighter radios, simpler user interfaces and more expeditionary command posts. As the NIE evolved into more of a test event, the Army recently added the complementary AWA, which offers an environment less constrained by test events and parameters and more focused on evaluating prototype concepts and capabilities.

Consistent with the Army’s acquisition reform and rapid prototyping efforts, the AWAs offer



### TESTED BY SOLDIERS, FOR SOLDIERS

The author, right, speaks with Brig. Gen. Kenneth L. Kamper, left, commander of the U.S. Army Operational Test Command, and Col. Charles Masaracchia, 2nd Brigade Combat Team, 1st Armored Division commander, during NIE 16.2 in March at Fort Bliss, Texas. The NIE process was designed to bring the acquisition, requirements and test communities together. (Photos by Vanessa Flores, SoSE&I)

the opportunity to “fail early and fail small”—to try things out before they become major programs with more at stake. They also provide an opening to collaborate with industry during the initial stages of building requirements, supporting informed and agile development from the start. These early opportunities can streamline the time required to get the technologies into the hands of the warfighter in the right form, fit and function.

Over the past several months, Army leaders across the acquisition, test, requirements and user communities have conducted discussions regarding the future of NIEs and AWAs. While NIEs are designed to validate specific goals associated with the Mission Command Network of 2020, Army modernization efforts have no estimated delivery date—they’re continuous.

This constant refinement of the network and other capabilities is critical to building and equipping an agile, adaptive future force, which is one of the top three priorities of the chief of staff of the Army (CSA). While we continue to operate within a resource-constrained environment, the NIE and AWA construct is now

poised to support the future force through more aggressive prototyping, as well as broader modernization efforts including non-network technologies, interoperability with joint and coalition forces, and solutions that go beyond materiel.

### AN EVOLVING CONSTRUCT

Since Army leaders began shaping the NIE in 2010, it has evolved to meet Army priorities. (See Figure 1.) At the outset, the goal was to hold a large-scale event twice a year for Soldiers to test and evaluate tactical communication systems—programs of record (PORs), theater-provided equipment and emerging products from industry—at the same time and place. Because of wartime necessity and the culture of the acquisition system, the Army had been developing and delivering individual network components on different timelines, even though they ultimately had to function as a system of systems.

Before the NIE, the Army faced several challenges concerning technology maturation and the network. Individual modernization efforts were scattered across the country, making it difficult for the overall network to operate as it should. Decentralized



efforts with multiple organizations working on different aspects of modernization created more confusion than progress. Real-time systems engineering would happen up front, only to stop later in the life cycle. Equipment issues were coming to light far down the line instead of in the early prototyping stages.

The NIE aimed to solve these challenges, while also offering a structured process for industry to demonstrate promising technologies that targeted specific capability gaps identified by the Army. But as several events passed, vendors who had invested their own resources to participate grew restless with the Army's initial lack of a formal mechanism to purchase non-POR systems that performed well, and with the events' growing emphasis on POR tests at the expense of reduced industry participation. The Army took steps to address their concerns and ultimately decided the best course was to split the construct into two events: an annual NIE focused on operational testing for PORs, and an annual AWA focused on joint and multinational interoperability, readiness and industry solutions.

#### LOOKING AHEAD

I have been closely involved with the NIE and AWA process since 2014. The following recommendations, which we call "modernization by the numbers," are derived from that experience.

**1. Continue to broaden the perspective of the NIEs and AWAs, facilitating an all-encompassing capabilities objective.**

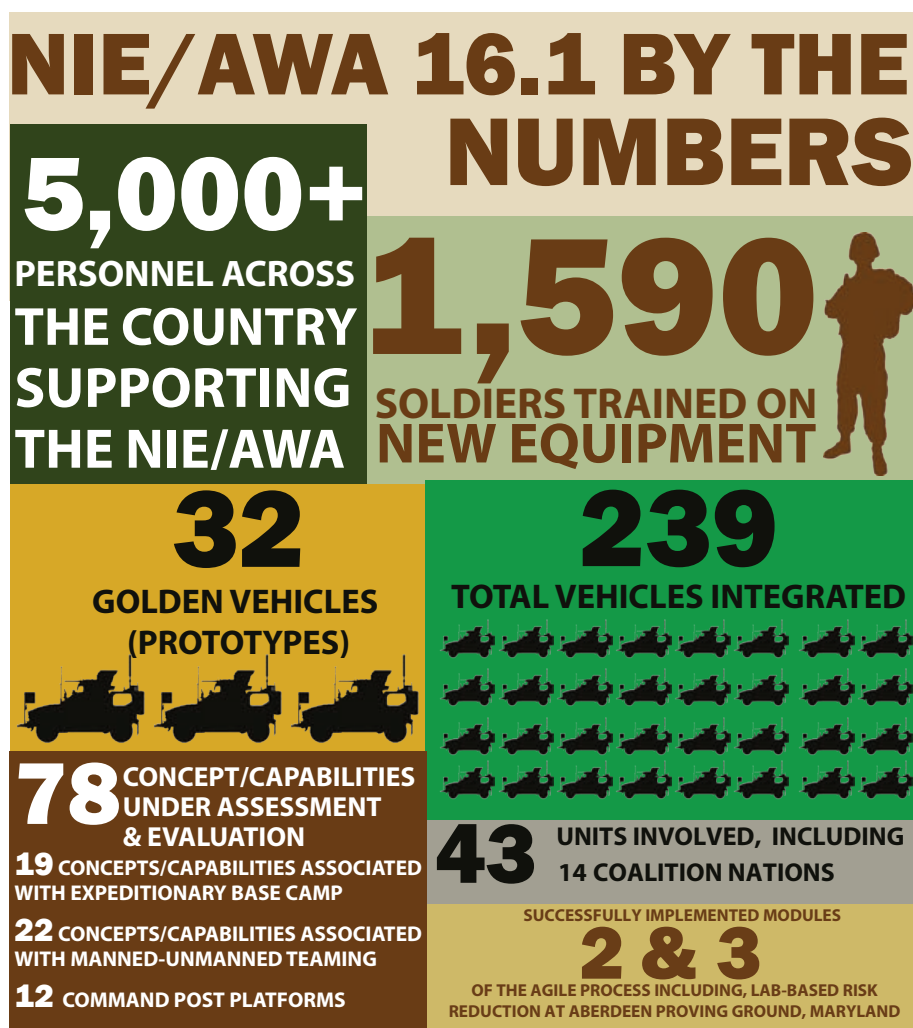
As the Army continues to protect and serve here and abroad, the need to evolve our network will always exist. While the NIEs are associated with delivering the Mission Command Network of 2020, there is no definitive end state as technology will continue to advance across

the globe. But we realize that Soldiers' requests for innovative, user-friendly technology reach beyond just the network. As the NIEs and AWAs evolve, we must shift their focus from being solely "network centric" to evaluating a broader

range of capabilities, with non-network capabilities having a larger role.

Today, as the CSA recently stated, DOD is rarely driving new technologies. Instead, commercial industry is in the

FIGURE 1



#### ADDING IT UP

The Army's Network Integration Evaluation (NIE) 16.1, held in September-October 2015, was the Army's largest such exercise since the NIE events began in 2011. Held in conjunction with the Bold Quest exercise led by the Joint Staff J-6, NIE 16.1 included broad joint and coalition participation and served as the Army's final proof of concept for the Army Warfighting Assessment (AWA) events. AWA 17 will kick off in October 2016. (U.S. Army graphic by Vanessa Flores, SoSE&I Capability Package Directorate)



lead. This applies beyond the network as well. Using the NIEs and AWAs to bring in commercial technology from different capability sectors, turning it over to Soldiers to try it out, and providing oversight of military-specific security parameters as the technology is being developed, will be key to productive interaction with industry.

Evaluating early variations and advancing more rapidly through the prototyping process gives commercially developed technology a greater chance of getting fielded or transitioned into a program management office. Naturally, there will be instances when some of the equipment may need more work or we realize it is not a capability we need, eliminating the fielding of ineffective equipment. A “capability integration evaluation” or similar event will be the driving force behind finding and refining solutions and ensuring that our Soldiers will be well-equipped.

This step directly aligns with the CSA’s recent report to Congress on Army acquisition, which made clear that experimentation and prototyping are on top of the priorities list. The AWAs were specifically developed to place early technologies and concepts in a

field environment. Unlike the NIE, the AWA is not a structured test, so there is room for experimentation. The AWAs will engage technology from early prototypes all the way to more mature capabilities at Technology Readiness Level 6—testing of prototypes in a controlled environment—and beyond. As the AWA evolves and aligns with the guidelines provided by the CSA, it will incorporate a broader group of industry partners, yielding value-added capabilities for the near term.

**2. Use NIEs and AWAs to align the capability requirements within the U.S. Army Training and Doctrine Command (TRADOC) and the assistant secretary of the Army for acquisition, logistics and technology communities.**

Currently, materiel developers receive capability requirements documentation from TRADOC capability managers. Based on those requirements, capabilities are built or procured to address gaps and provide solutions. But as Soldier feedback shows, the solutions provided at times may not be precisely what the Army needs. An example involved one of the Army’s major capabilities under assessment and evaluation for technical merit and ease of use for Soldier operators. While it met the

**ADDRESSING  
SOLDIER CONCERNS**

Maj. Gen. Paul E. Funk II, assistant deputy chief of staff, G-3/5/7, talks with a Soldier at the Integration Motor Pool during his visit to NIE 16.2 in March at Fort Bliss. Since Army leaders began shaping the NIE in 2010, it has evolved to meet Army priorities.

technical capability requirements, the equipment was extremely complex to use. NIE participation resulted in direct Soldier feedback on ease of use, enabling the PM to implement capability improvements that simplified Soldier-operator tasks.

To increase the impact of NIEs and AWAs in effectively shaping requirements, as part of the NIE/AWA planning cycle, the Army could hold a one-week symposium for each portfolio holder, where combat developers and materiel developers could come together. Such an event would help bridge the gap between the requirements and the solutions provided and could ensure that both are informed by Soldier recommendations from the NIE and AWA exercises.

A shift toward more rapid procurement also could be facilitated by the Army Requirements Oversight Council (AROC) as it evolves into a command-centric forum. The AROC’s ultimate goal, as the CSA wrote, “to ensure that the warfighter receives the right capability in the timeframe that makes it useful on the battlefield and within cost,” directly aligns with the NIE and AWA efforts. Additionally, the newly proposed Army Rapid Capabilities Office may leverage

the NIEs and AWAs to confirm the utility to Soldiers of prototype technologies. Requirements writing can become more streamlined, and technologies can be procured and delivered to Soldiers at a faster rate.

### 3. Use industry's proficiencies effectively by making participation in NIEs and AWAs more straightforward.

Industry is ready to help, but it is up to the military to educate them on the technology we need and the processes by which to provide it. While leading defense contractors have the know-how and the ability to bring their technology into the government sector, we don't always communicate as well with smaller and nontraditional vendors. This is to everyone's detriment: When government needs are closely held, the requirements

get stuck within a silo, reducing capability options and increasing the negotiation power of the few industry partners. We also need to ensure effectiveness for equipping beyond PORs, which we can accomplish only through broader industry input.

Healthy industry competition pays multiple dividends, including lower costs. If a smaller, niche company has a product prototype with the exact capabilities needed, why deter it with bureaucracy? As we move forward with NIE and AWA, we must continue to simplify processes and remove barriers to facilitate the robust participation of all companies. Currently, although information addressing the processes to participate in these events is posted on the Federal Business Opportunities website, informing the small business community still involves

a certain level of complexity. From my perspective, larger businesses spend considerable time and effort tracking NIE and AWA opportunities. However, some smaller businesses capable of providing some of the same critical, lifesaving technologies are not as familiar with the events or the processes. Key areas for improvement include developing and providing clear requirements early in the NIE/AWA process to enable potential vendors to better understand capability gaps and requirements that the Army is trying to source. At the same time, the biggest barrier to maximum vendor participation continues to be the expectation that vendor capabilities conform to and operate on a classified network.

### CONCLUSION

NIEs and AWAs are great venues for testing and providing early prototypes to be used and assessed by Soldiers. However, a few process tweaks can make these events even more optimal for delivering the right equipment to our warfighters at a faster rate. As we move forward to execute the CSA's modernization road map, NIEs and AWAs will serve as a critical vehicle to meet Soldiers' needs.

For more information, go to [www.army.mil/sosei](http://www.army.mil/sosei).



### DOUBLE-CHECKING SYSTEMS

A Soldier inspects the equipment on the back of her vehicle at the integration motor pool to ensure that everything is connected properly during NIE 16.2 in March at Fort Bliss. The NIE has succeeded in facilitating Soldier-driven design and integration progression.

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3<sup>rd</sup> Annual

# Major General Harold J. "Harry" Greene Awards for Acquisition Writing



"In every job I had we got things done that I think made our Army better, and it was done by other people... all I did was try to pull people in the right direction and they went and did great things."

- 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 experiences and bright ideas by submitting articles, essays and opinion pieces in the following categories:

- Acquisition Reform / Better Buying Power
- Future Operations
- Innovation
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*For complete competition details, go to*

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FROM THE DIRECTOR,  
ACQUISITION CAREER MANAGEMENT  
LT. GEN. MICHAEL E. WILLIAMSON

# MILITARY-INDUSTRY COLLABORATION *for* SOLDIER SUCCESS



Combined efforts yield deliberate investments in Soldier training, equipping and leader development

*In developing the Army equipment modernization strategy, we carefully assessed risks across all portfolios to ensure balanced development of new capabilities, incremental upgrades to existing systems and protection of ongoing production to sustain the industrial base.*

The United States Army is the most formidable ground combat force on Earth, with Soldiers conducting diverse missions in 140 countries. These missions include fighting terrorists worldwide; training Afghan and Iraqi army forces; peacekeeping in the Sinai Peninsula and Kosovo; missile defense in the Persian Gulf; security assistance in Africa and South America; deterrence in Europe, the Republic of Korea and Kuwait; and providing rapid deployment global contingency forces and response forces for the homeland. Today's Army continues to excel at these varied and enduring missions the result largely of the deliberate investments in Soldier training, equipping and leader development.

As members of the Army Acquisition Workforce, we are charged with providing Soldiers a decisive advantage in all missions by developing, acquiring, fielding and sustaining the world's best equipment and services through efficient leveraging of technologies and capabilities to meet current and future Army needs. The success of our well-educated and well-trained workforce is possible because of the combined efforts of Congress, the nation's industrial base and the Soldiers who test, train, deploy and take our weapons to war.



#### KEEPING OBJECTIVES CLEAR

Soldiers assigned to the 3rd Infantry Division move under the cover of smoke May 16 during Decisive Action Rotation 16-06 at the National Training Center, Fort Irwin, California. With Soldiers conducting diverse missions in 140 countries, the strength and vitality of the defense industrial base are vitally important. (U.S. Army photo by Spc. Kyle Edwards, National Training Center Operations Group)

#### THE ESSENTIAL MISSION

Over the past several years, fiscal constraints and an unpredictable budget have caused the Army to reduce end strength and prioritize readiness at the expense of modernization programs, and these conditions are likely to continue into the near future. Since FY12, research, development and acquisition accounts have declined by more than 30 percent. Still, our modernization mission remains essential.

Our modernization strategy is focused on the following:

1. **Science and technology (S&T).** Protected S&T funding ensures that the next generation of breakthrough technologies can be applied rapidly to existing or new equipment designs. We are implementing a strategic approach to modernization that includes an awareness of existing and potential gaps; an understanding of emerging threats; knowledge of state-of-the-art commercial, academic and government research; and an understanding of competing needs for limited resources.
2. **New systems.** The Army is making modest developmental investments based on critical operational requirements and capability shortfalls. Key investments in the next generation of ground vehicle capabilities include the Armored Multi-Purpose Vehicle and the Joint Light Tactical Vehicle (JLTV), a critical program for the Army and the U.S. Marine Corps.
3. **Modification and modernization.** The Army must incrementally modify or modernize existing systems to increase capabilities and extend service life. Additionally, the continuous improvement of existing systems helps to sustain the industrial base. In this area, we are improving the Abrams, Bradley and Stryker families of vehicles, as well as Paladin. We are also improving the Apache, Black Hawk and Chinook helicopter fleets, as well as our unmanned aircraft systems.
4. **Reset and sustainment.** Returning Army equipment to the required level of combat capability remains central to both regenerating the equipment and maintaining its near-term readiness for contingencies.
5. **Divestment.** The Army divestment process seeks to identify excess equipment and systems across the total Army to reduce and eliminate associated sustainment costs. For example, we



are divesting the aging M113 armored personnel carriers. Additionally, divestment of the Army's Mine Resistant Ambush Protected vehicles will eliminate a large portion of the fleet through foreign military sales, distribution to other agencies and demilitarization of older, battle-worn, excess vehicles. The Army also continues to divest its aging TH-67 training helicopters, as well as the OH-58A/C Kiowa, OH-58D Kiowa Warrior, and UH-60A Black Hawk fleets.

The defense industrial base responds to changes in military missions and strategies, which is one reason that reductions in the Army's modernization account continue to present significant challenges for our industry partners, especially for companies that do not have commercial sales to leverage and for small companies that must diversify quickly. In developing the Army equipment modernization strategy, we carefully assessed risks across all portfolios to ensure balanced development of new capabilities, incremental

*The Army remains concerned about the preservation of key skills and capabilities in the manufacturing base for both our original equipment manufacturers and their key suppliers.*



#### PROTECTING FUNDING PROTECTS SOLDIERS

Sgt. Danilo Mendoza, biomedical science technician with the U.S. Army Institute of Surgical Research, explains the operation of a shock tube—designed to simulate exposure to explosions like the ones a Soldier may encounter in combat—in February at Joint Base San Antonio – Texas. Protected S&T funding ensures that the Army can rapidly apply breakthrough technologies to develop the capabilities Soldiers need. (U.S. Army photo by Sgt. Aaron Ellerman, 204th Public Affairs Detachment)

upgrades to existing systems and protection of ongoing production to sustain the industrial base.

#### PUBLIC-PRIVATE SUCCESSES

There are several examples of successful partnering efforts that benefit both the Army and our organic and commercial industry partners. In the area of public-private partnerships, Anniston Army Depot in Alabama and General Dynamics Land Systems have a long-standing partnership to improve the survivability of the Stryker family of vehicles. Their latest effort is the Stryker double-v hull (DVH) exchange program, whereby a newer DVH design is reducing the vehicle cost. In another area, the JLTV program is well on track to close a critical capability gap for America's Soldiers and Marines with total quantities to be delivered sooner than expected for less cost than planned.

This was not without a lot of advance effort and planning. The Army initiated a tiger team in 2010 to conduct a cost-informed trades assessment to reduce JLTV's schedule and cost. The Army and industry worked together to finalize the "essential" capabilities required in a base vehicle. In the end, the assessment improved the balance between capability and affordability well in advance of the contract award in 2015.

The Army remains concerned about the preservation of key skills and capabilities in the manufacturing base for both our original equipment manufacturers and their key suppliers. Tobyhanna Army Depot in Pennsylvania, for example, is the depot where all services get repairs for the Gray Eagle (MQ-1C) unmanned aircraft system ground control stations, because of its infrastructure, training and technical expertise. Teaming and collaboration with our industrial



### MAINTAINING THE INDUSTRIAL BASE

Technicians install equipment onto a High Mobility Multipurpose Wheeled Vehicle during the Network Integration Evaluation 16.2 fleet build earlier this year. The continuous improvement of existing systems helps to sustain the industrial base in the absence of new programs and new system development. (U.S. Army photo by Vanessa Flores, System of Systems Engineering and Integration Directorate)



### BUILDING SOLDIER SAFETY

Sheet metal mechanic Jeff Urbanovitch tests the fit of brackets on the bottom of a Robot Deployment System at Tobyhanna Army Depot. The system, which will position route clearance robots, will help protect the Soldiers who test, train with and take our weapons to war. (Photo by Steve Grzedzinski, U.S. Army Communications-Electronics Command)

base partners early helps to reduce risk. Where applicable, the Army supports the efforts to develop foreign military sales and direct commercial sales that also can help to sustain our industry partners.

The Army's approach to risk mitigation focuses on continuous assessment of defense industrial base risks across all portfolios through fragility and criticality assessments and industrial capability assessments. Both approaches enable the Army, our sister services and the Office of the Secretary of Defense to identify risk in the industrial base and develop appropriate mitigation strategies. The information gleaned also enables Army program offices to accurately gauge how potential reductions in funding can affect suppliers that provide the capabilities, products, skills and services needed to maintain readiness.

For example, the Army has completed several studies, both internal and through independent consultants, to assess the health and risk in the track vehicle, tactical vehicle, aviation and ammunition industries. We also have assessed the current skills and retention requirements of our workforce in the Army's depots and arsenals. These assessments not only help us to see our industry partners and ourselves more clearly, but also enable us to work collaboratively to mitigate risk and help ensure the health of the defense industrial base.

Some of our mitigations have included identifying and shifting work to the arsenals to preserve our access to legacy items still in the system. For others, we have entered into multiyear contracts to stabilize demand for our industry partners. We are also promoting competition to ensure multiple sources where possible.





#### MODERNIZING MAJOR WEAPON SYSTEMS

M2A3 Bradley Fighting Vehicles conduct an area reconnaissance in May during a situational training exercise lane as a part of Combined Resolve VI at Hohenfels, Germany. The Army is incrementally modernizing existing major systems to increase capabilities and extend service life. (Photo courtesy of Ralph Zwilling)

The strength and vitality of the defense industrial base are vitally important to our Soldiers, the Army and our nation. We continuously engage our industry partners through numerous forums to increase dialogue and collaboration. With the knowledge exchanged in these forums, we are collectively investing in technologies and developing modernization strategies to meet future Army requirements.

Through successful collaboration, we serve our Soldiers better. In December 2015, the Secretary of Defense Performance Based Logistics (PBL) Awards recognized government-industry teams that demonstrated outstanding achievements in providing warfighters with exceptional operational capability. The Army's Javelin Joint Venture PBL Team, of the Close Combat Weapon Systems (CCWS) Project Office in the Program Executive Office for Missiles and Space at Redstone Arsenal, Alabama.

The team was recognized for implementing a PBL solution between the Army CCWS Project Office and Javelin Joint Venture, a partnership of Raytheon Co. and Lockheed Martin

Corp. that provided the Javelin warfighter with the highest level of mission success and tactical operational readiness—a level greater than 99 percent for eight consecutive years, far surpassing contractual requirements of 90 percent. Additionally, with the restructuring of the Javelin life cycle contractor support, the current PBL contract cost dropped from \$62 million per year to \$32 million per year, a dramatic 48 percent reduction brought to fruition through use of historical data on hardware performance and actual demands on the supply system.

#### CONCLUSION

The defense industrial base—commercial and organic—our experienced acquisition workforce and funding provided by Congress on behalf of the American taxpayer are critical in the Army's ongoing efforts to provide Soldiers with the finest, most technologically advanced equipment available.

Our goal is to provide them with the decisive advantage so they will always accomplish any mission, anytime and anyplace. ■





# FACES *of the* FORCE

**MS. SHARON SNOW**

## Leveraging the overlap

### MS. SHARON SNOW

#### COMMAND/ORGANIZATION:

Army Contracting Command –  
Aberdeen Proving Ground

#### TITLE:

Contracting officer

#### YEARS OF SERVICE IN WORKFORCE:

6

#### DAWIA CERTIFICATIONS:

Level III in contracting; Level I in  
program management

#### EDUCATION:

B.A. in business, Notre Dame of  
Maryland University

#### AWARDS:

Achievement Medal for Civilian  
Service; Certificate of Appreciation (3)

**I**magine this: One week you're selling walk-in freezers and coolers to the construction and food service industries. The next, you're working on contracts to make sure warfighters have the tools they need for cyberwarfare. Sounds like a big switch, right?

Actually, there's more overlap than you might think, or so said Sharon Snow, a contracting officer for the Army Contracting Command – Aberdeen Proving Ground (ACC-APG), Maryland, who made that transition six years ago.

"A lot of what we did in sales was building relationships. It wasn't just a one-time sale; we depended on repeat customers," said Snow. "And while the pace of contracting differs from the 'sell, sell, sell' tempo of inside sales, relationships are very important."

Snow now supports the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD). Before that, she supported the Intelligence and Information Warfare Directorate at the U.S. Army Communications-Electronics Research, Development and Engineering Center and spent six months at the Software Engineering Center of the U.S. Army Communications-Electronics Command.

"Coming from the private sector to the public sector was a big transition," she said. "In addition to adjusting to a different operational tempo, I had to learn a whole new culture: how the Army operates, how contracting works—a whole new language, really. But what I've really been impressed by is how much the Army values its people, something that you can see from the amount of resources they devote to training, developing and mentoring the workforce."

### What do you do in your position, and why is it important to the Army or the warfighter?

As a contract officer leading a team of contract specialists, I support the JPEO-CBD by providing expertise for all phases of contracting, from planning requirements to source selection, award, administration and closeout. I support research and development efforts that enable the Army to maintain its technological edge to advance warfighter capabilities and ensure its long-term superiority. I'm very proud of the work I have done supporting activities that are pushing the boundaries of current technology and discovering innovative solutions to prevent and defend against threats to our warfighters.

*"We can always do things better, faster and smarter. I am a big proponent of continuous process improvements."*



## How did you become part of the Army Acquisition Workforce, and why?

I worked in the private sector for a company that was downsizing operations because of the economic downturn in 2009. At the same time, BRAC [the Base Realignment and Closure Commission] was moving jobs to APG, and I accepted a position as an intern contract specialist. Although I had opportunities outside of the Army, I was interested in doing something that mattered in my career. My father served in the Army for 20 years, then worked as a contractor and finally as a civilian employee supporting Navy software programs; therefore, I was very excited to be given the opportunity to support warfighters and follow, at least a little ways, in his footsteps.

## What do you see as the most important points in your career with the Army Acquisition Workforce, and why?

I had the opportunity to serve as a team lead on the contracting officer's representative (COR) project to ensure that ACC-APG records in VCE-COR [a Virtual Contracting Enterprise tool] were complete and in compliance with the regulations, and as a team lead contracting officer on a temporary assignment to a different division in ACC-APG. Both of these assignments provided insights from different perspectives and expanded my contracting knowledge. Developing the ability to see the big picture of an acquisition and the impacts of different approaches has been instrumental to my ability to make sound business decisions.

## Has a mentor or mentors helped in your career? How? Have you been a mentor?

I have not had an official mentor, but the branch chiefs and division chiefs I have supported have always acted as mentors. They have taken the time to teach me,

exploring acquisition options, patiently answering my numerous questions and talking out topics until I understand. I have learned a lot from each of them. I act as a mentor now and make it a priority to facilitate a learning environment and foster critical thinking. I often learn as much as those I mentor.

## What one skill or ability is most important in doing your job effectively?

Communication, both written and oral. There is nothing I do that does not require good communication skills. When writing and reviewing documents, I need to ensure the entire story is accurately, concisely and clearly conveyed. Good communication skills are invaluable in meetings when developing acquisition strategies, during negotiations when defending the government's position, and when helping others on my team through new or difficult situations. The most important communication skill anyone can possess is the ability to be a good listener. By listening effectively, you can understand the perspectives of others and more effectively work toward the optimum solution to resolve any issue.

## Is there a skill that you learned outside your present career that has come in handy in your work for Army acquisition?

During my work outside of the government, I learned the importance of possessing good customer service skills. In sales, customer service is something that can lead to a business's success or failure; the same can be said for any government program or agency. As a contracting officer, I am always looking for ways to provide anyone with whom I work fast, effective and exceptional customer service. My focus is on getting the customer what they need, while adhering to the rules and regulations by which I am bound. This can be a challenging balancing act, but

the lessons I learned in sales taught me the value of finding win-win solutions.

## If you could break the rules or make the rules, what would you change or do?

Our laws, regulations, policies and reviews, however frustrating they can be at times, are there for a purpose. That said, we can always do things better, faster and smarter. I am a big proponent of continuous process improvements. Small changes, combined over time, result in monumental improvements. If I could effect one change, it would be to facilitate a more collaborative working environment between customer and buyer. One of the biggest sources of frustration I have encountered is between the program office, the customer, and the acquisition support team, the buyer. While both are working to achieve the same goal, each activity has its own priorities and perspectives. To facilitate better collaboration between the two, I would initiate a six-month job rotation between contracting and program office personnel. If each activity had insight and understanding into the other's requirement and acquisition processes, their expanded perspectives would facilitate better document execution, synergized processes and more effective collaboration.

## What advice would you give to someone who aspires to a career like yours?

You will never know it all, so never stop learning! Take an active role in your career by seeking out different types of work and job rotations. Remember that everyone you meet knows something you don't, says Bill Nye. Ask questions, keep an open mind, work collaboratively, develop an environment of information sharing, be organized, respect everyone and work hard.

—MS. SUSAN L. FOLLETT

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

# SHRINKING *the* *DIVIDE*

Soldiers training with industry see how the ‘other side’ works  
so they can help Army acquisition work better



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

Working in Army acquisition—getting the very best products and services for Soldiers and sensibly stewarding taxpayer dollars—is a privilege and an honor. Because those responsibilities are so important, because our success is often measured in lives saved, they come with a lot of regulation, scrutiny and a slower pace of getting things done. So it is no surprise that acquisition officers, though fully cognizant of how rewarding our work can be, may occasionally find themselves looking enviously at the private sector, which can seize investment opportunities in a matter of days, where employees in T-shirts and jeans have time and space to bat around off-the-wall ideas, and where the company is constantly rethinking the way it does business.

Ten Army acquisition officers and two noncommissioned officers (NCOs) don’t have to envy the private sector; they can go join it for a year. If spending a year immersed in a completely different corporate culture sounds interesting to you, the Training with Industry (TWI) program,

sponsored by the Army Director, Acquisition Career Management (DACM) Office, could be the career-broadening opportunity you’ve been looking for. You can take the best of corporate America and come back to your Army acquisition career fired up to apply those lessons learned to the continuing challenge of maintaining Soldiers’ overmatch as budgets decline.

## STEP ACROSS THE DIVIDE INTO A DIFFERENT WORLD

TWI participants experience the “other side” of the government-industry partnership, acquiring managerial techniques, business practices and lessons learned from the world of industry, and then bringing the best of those experiences to follow-on acquisition leadership assignments where they can share them with leadership, peers and subordinates. After the rather rigid structure of the Army, experiencing the cultures and business practices in industry can be quite eye-opening—and, especially for those in acquisition, can help them better understand the mindset across the negotiating table.

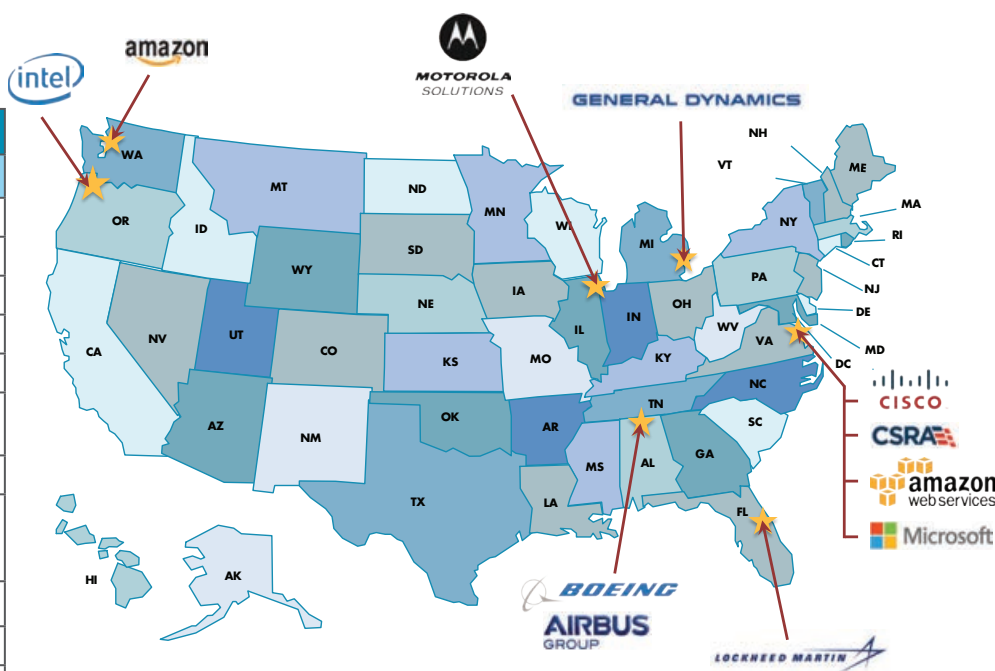




FY 16-02 TWI Portfolio	
Company	Location
Airbus Group	Huntsville, Alabama
Amazon	Seattle, Washington
Boeing	Huntsville, Alabama
Cisco	Herndon, Virginia
CSRA	Falls Church, Virginia
General Dynamics Land Systems	Sterling Heights, Michigan
Intel	Hillsboro, Oregon
Lockheed Martin Mission Systems and Training	Orlando, Florida
Microsoft*	Reston, Virginia
Motorola**	Chicago, Illinois
Amazon Web Services*	Herndon, Virginia

\*NCO – Started in FY15

\*\*New for FY16



### COAST-TO-COAST OPPORTUNITIES

TWI applicants have a wide variety of companies to choose from in seeking on-the-job experience in the private sector that will give them a better understanding of the relationship between government and industry. (SOURCE: USAASC)

As Lt. Gen. Michael E. Williamson, the Army DACM, told new TWI participants and company sponsors at a recent orientation, TWI creates open communication among the Army, the acquisition Soldier and industry partners. “You bring tremendous knowledge and capability from your experiences,” he said. “It also gives us an opportunity to share with our industry partners some insights about what we do and what drives our thinking.”

The competition for each TWI cohort’s slot is tougher than ever. Three years ago, the selection rate was 70 percent; the following year, it was 50 percent; and the past year, 30 percent. Though the bar has risen significantly, TWI is likely to be among the most rewarding assignments of your acquisition career, not because it’s easy but because it’s hard. It provides participants a chance to step back and see a different side of things, and then directly use those experiences to make Army acquisition more efficient and effective.

Lt. Col. Mark Henderson, product manager for the Warfighter Information Network – Tactical Increment 1, spent his 2013-14

stint in TWI with Cisco Systems Inc. To his way of thinking, TWI helps officers look ahead and make good decisions, which can be applied later in the military commanders’ areas of responsibility.

And it’s not just the government that benefits. The companies competing to host Army acquisition’s top talent are big names: Amazon.com Inc., Amazon Web Services Inc., Airbus Group Inc., Boeing Co., Cisco Systems Inc., CSRA Inc., General Dynamics Land Systems, Intel Corp., Lockheed Martin Mission Systems and Training, Microsoft Corp. and Motorola Solutions Inc.—a testament to the desirability of Army Acquisition Workforce members as employees, even temporarily. We consistently get feedback on Soldiers’ great work ethic. John Paulson, General Dynamics Land Systems’ TWI sponsor, said that his company’s employees are consistently impressed with “how the officers quickly accomplish their assignments and move on to the next one.” (For an in-depth look at one Army acquisition officer’s TWI experience at Amazon, read “One ‘Peculiar’ Fellowship,” Page 160.)

### NEW SLOTS FOR NCOS

This year's TWI cohort included acquisition NCOs for the first time, with two slots in the 51C military occupational specialty. Master Sgt. Kelly Butler will complete his yearlong tour with Amazon Web Services (AWS) in mid-August. Butler has learned the basics of cloud computing services, contract procedures and attentive customer service, ensuring that the products and services he handles meet customer wants and needs.

"I feel like a true member of the AWS team, since everyone is willing to share knowledge and experiences," he said. "I am set up for success during my training here and am able to take initiative on projects that are important to me."

Sgt. 1st Class Patrick Dennis, who started his 12-month trek with Microsoft in August 2015, has learned from the company, and the company has learned from him. He's using his leadership skills and contracting expertise to help his team at Microsoft understand the Army acquisition process and get a deeper appreciation of federal contracting. In return, he not only picked up industry business practices, but he also realized that he has transferable skills that are valuable outside of the Army.

"I'm taking away a better understanding of how industry operates, especially when it comes to contracts," he said. "I'm working and seeing firsthand Microsoft's section that sells services and products to all the government agencies."

### GETTING THERE

What does it take to earn a spot and succeed in the program? The companies tell the Army what specific qualifications they're looking for—an MBA, engineering experience, Lean Six Sigma training—and assignment officers help candidates match their background and interests with the right company. That said, since the culture may be far different from the military way of doing business, all positions require assertiveness and flexibility.

TWI participants can design their own experience to some degree to help meet that challenge. For example, if you're interested in a particular company that's not on the TWI list right now, reach out; the U.S. Army Acquisition Support Center (USAASC) might be able to find a way to make it work if the company is a good fit. Participants also work with the sponsoring company to design specific training objectives for their assignments.

Of course, the in-depth private-sector experience gained through TWI carries an obligation: Each participant must sign a three-for-one active-duty service obligation before starting the program, meaning a commitment to serve three years of active duty for each year of training.

### CONCLUSION

Selected TWI officers and NCOs represent the very best of Army acquisition. As a result, the screening process is extensive and thorough, with only our highest-performing Soldiers making the cut. The application deadline for the FY17 TWI cohorts, for assignments starting in April and July 2017, is Nov. 3, with the selection board convening in mid-November.

Lt. Gen. Williamson and I expect our TWI Soldiers to go confidently to their partner companies, learn as much as possible, contribute, cooperate as full team members and then bring back that corporate knowledge to share and apply it for the rest of their Army acquisition careers.

*For more information on the TWI program, go to <http://asc.army.mil/web/career-development/programs/aac-training-with-industry/>; or contact Maj. Alex Babington, TWI program manager, at [alexander.c.babington.mil@mail.mil](mailto:alexander.c.babington.mil@mail.mil) or 703-805-2491.*

*The competition for each TWI cohort's slot is tougher than ever. Three years ago, the selection rate was 70 percent; the following year, it was 50 percent; and the past year, 30 percent.*



# Forging a PARTNERSHIP on the Shop Floor

'America's cannon factory' used a public-private partnership to save its skilled workforce from a postwar dip in demand and preserve a critical manufacturing capability in the Army's organic industrial base.

*by Ms. Mary Kate Aylward*



## BIGGER, BETTER

Tracy Rudolph, president and chief operating officer of Electralloy, and Col. Lee H. Schiller Jr., Watervliet Arsenal commander, stand in front of the three Electralloy furnaces as they display an American Bureau of Shipping certificate. The certificate expands the number of products the arsenal can manufacture, bringing more work to the arsenal than was originally anticipated under the public-private partnership. (Photos by John B. Snyder, Watervliet Arsenal Public Affairs)

DOD has only one source for large-caliber cannons: Watervliet Arsenal, in operation in Watervliet, New York, since 1813. As the home of Army-designated “critical manufacturing capabilities,” which don’t exist anywhere else in the U.S. industrial base, Watervliet, its forges and the skilled workers who operate them are assets that a commercial supplier simply cannot replace. But the loss of that workforce is exactly what the arsenal faced in 2011 after the wars in Iraq and Afghanistan wound down. Revenue had dipped to \$88 million, down from \$133 million in 2009, as the Army required fewer of the high-tech, high-powered cannon, howitzer and mortar systems that Watervliet produces.

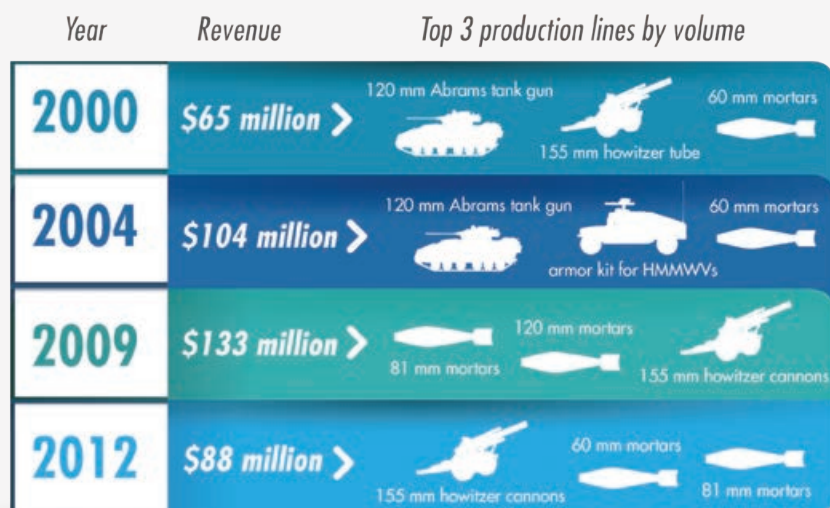
The arsenal saved its critical capabilities by forging a public-private partnership with Electralloy, G.O. Carlson Inc., a privately held metals company, that lets Electralloy use Watervliet’s facilities—so its workload becomes the arsenal’s workload. Workers at the arsenal—all government employees—fulfill orders for DOD, but also for Electralloy and its customers. “Our workload alone couldn’t sustain this,” said Joseph Turcotte, the arsenal’s deputy commander.

Between 2002 and 2010 as the Army fought two wars, orders for gun tubes and armor kits for High Mobility Multipurpose Wheeled Vehicles (HMMWVs) kept the arsenal’s forges busy. But production declined when the wars and defense spending



## A brief history of the Army's oldest arsenal

Watervliet Arsenal opened in 1813 on the banks of the Hudson River, just north of Albany, New York, producing leather and metal goods, including gun carriages, cartridges and saddles for the young U.S. Army during the War of 1812. During the Civil War, the arsenal produced 7 million bullets a month. In the 1880s the arsenal refined its focus to large-scale metalworking and earned its nickname of "America's cannon factory." World War II saw the arsenal's highest production and personnel numbers. From 1941 to 1944, more than 9,300 employees at the arsenal (almost one-third of them women) manufactured more than 23,000 cannons. Today the arsenal continues to manufacture the 120 mm Abrams tank gun, 155 mm howitzer cannons, and 60 mm and 81 mm mortars.



### MODERN-DAY MISSION

Before the public-private partnership, the arsenal's fortunes rose and fell with cycles of conflict. (SOURCE: USAASC)

wound down, and the arsenal lost workers. Sequestration worsened the pain. "We had to furlough employees, and that prompted many to think about retiring, so that made skills retention even more urgent," Turcotte said.

Operating the 1970s-era rotary forge that produces gun tubes (and other cylindrical objects) is "an expensive

machining process," Turcotte explained. It's a unique piece of equipment with a high fixed cost of ownership, including salaries and training for specialized workers, maintenance and supplies, whether it's producing 100 gun barrels or 1,000.

The jump in demand after 9/11 masked the deeper difficulty of keeping the forge running and retaining a skilled workforce

independent of the cycles of conflict and peacetime. The skilled workforce is as much of an investment as the forge equipment, and a trained metal processor can't be easily or cheaply replaced. It can take up to four years before a metal processor reaches full potential: 12 to 18 months to earn a forge operation certification, followed by welding certifications and specialized training from GFM, the company that made the rotary forge. Workers need advanced hand-foot-eye coordination and a fundamental understanding of metallurgy (how much heat a given metal or alloy can tolerate and at what stage), plus knowledge of welding, composite manufacturing and heat treatment.

In 2013, just five workers, all nearing retirement age, staffed the rotary forge at Watervliet. Today there are 20. The upgraded rotary forge is fed by new gas furnaces that are 20 percent more efficient. And while the fiscal environment has not materially changed, the arsenal's future looks much brighter.

### SUCCESS NOT GUARANTEED

How did they go about it? Turcotte and Tracy Rudolph, president and chief operating officer of Electralloy, both point to trust as the thing that made the partnership possible. The government had to clear regulatory hurdles that took years to navigate, and Electralloy had to be willing to invest "well over \$10 million" up front, according to Rudolph. They credit "a real trust at the outset," built on weekly supervisory meetings, consultations with employees and years of open, frank discussion as factors in overcoming the challenges that occurred as they set up the partnership. And in hindsight, it's clear that the partnership could have fallen victim to any number of business-as-usual biases, from "that's not how we do things" to "the government moves too slowly."



### A READY WORKFORCE

Metal processor Sean Stephenson applies resin to composite fiber on a bore evacuator at the Watervliet Arsenal in October 2015. Metal processors undergo rigorous training and require substantial skills in metallurgy, welding, composite manufacturing and heat treatment. Retaining their skills and experience, and the high level of readiness they provide for the Army, was the core problem the arsenal sought to solve with the P3.

In 2011, when negotiations began, public-private partnerships (P3s) were new territory for the Army. The arsenal was used to dealing with industry through direct sales, “but we weren’t real comfortable with sharing our processes and capabilities with a company,” Turcotte said.

Watervliet Arsenal also lacked the statutory authority to enter into such partnerships. The designation that allows an Army installation to be part of a P3 was granted only to depots until a 2013 rule change.

Additionally, arsenal workers were apprehensive about losing their jobs and protective of the equipment. “The fear was real at the employee level,” Turcotte said. “When Electralloy came to us and said, ‘We want to use your forge,’ the guys who run it,

that’s their baby. They didn’t want to let anyone else use it [and possibly] damage it.”

The slow nature of government acquisition was another hurdle. “If I were to give one piece of advice to another company about to do this, I’d say it’s gonna take time,” Rudolph said. “No matter what. But if you’re going to get into it, you have to put skin in the game ... you’re in it for the long haul.” Turcotte added, “I have 37 years in government, and I’m still continually surprised by how rules-bound the government is, especially in acquisitions.”

That government moves more slowly than private industry is hardly news, but it doesn’t have to be a deal breaker. Arsenal leadership kept Electralloy informed as the process moved through government wickets. Lesson learned: Being as specific as possible helped manage expectations. For example, “We’re not going to be able to do step X in two weeks; it’s more like three months,” as Turcotte recalled.

### PUTTING ‘SKIN IN THE GAME’

The team reassured workers early on that the partnership represented job security since it brought much-needed workload. It then opened a broader discussion with employees. To address concerns about wearing out the equipment, Rudolph and Electralloy suggested establishing a baseline for “what level we’ll maintain [equipment] at, what parts do we need to keep on hand, and so on, and then once we all agree on the baseline, we’ll assume responsibility for maintenance.” The government, from the line employees to arsenal leadership, needed to see that Electralloy had skin in the game, and gathering employee input first demonstrated that commitment. “Our employees saw that and said, ‘Hey, this company is good for us efficiency-wise and safety-wise,’” Turcotte recalled.

If the deal had reduced the number of government employees, as public-private cooperation sometimes does, fears of job loss could have been harder to allay. But the government insisted that the workers at the forge be government employees. This highlights another lesson learned: Know what problem you want the P3 to solve, and let that guide where you can give and where you can’t. Because the core problem was retaining a skilled government workforce (and not, for example, growing revenue), this wasn’t a point where the arsenal could compromise. “That was a key factor in our negotiation,” Turcotte said. “Tracy had to get comfortable with the idea that he’d have employees under government control.” The arsenal found a way to compromise and ease Electralloy’s apprehensions on that score, by making some of its cannon-forging processes similar to Electralloy’s solid-steel

processing. Thus, work for DOD and work for Electralloy have more in common, and the risk of errors as employees switch between tasks is lower.

### LEAVING THE COMFORT ZONE

Another lesson learned? The government needs to think outside the box. When Electralloy first expressed interest in the arsenal's capabilities, Watervliet had basically one way of dealing with industry, as Turcotte describes it. "We wanted to treat it like a direct sale: We'll process your work and here's what we'll charge for it. That wasn't working. Tracy came back to us and said, 'We'd like to truly partner.' That's when we had to work through the authorities and think outside the direct-sales box."

Getting the authority to formally enter into a partnership was a greater challenge. The U.S. Army Materiel Command (AMC), the arsenal's higher headquarters, tried for several years to get the Army's Center for Industrial and Technical Excellence (CITE) designation, which recognizes that an installation has a technical capability not found elsewhere and confers authority to join a P3 to preserve that capability. Until 2013, only depots could earn this designation. AMC repeatedly proposed making arsenals eligible, starting in 2008.

While they waited for the CITE designation, the partners took a leap of faith and signed an agreement with an understanding that it would be renewed every five years.

Thinking outside the box also means being willing to take suggestions from the industrial partner. For example, arsenal personnel used to be employed under narrowly specific job descriptions: crane operator, welder, heat treater. Rudolph "prodded" the government, as Turcotte

## FORGING 101

If you've always wanted to take a blacksmithing class, here's some background on the rotary forge that Watervliet workers use to forge gun tubes.

Forging is the process of shaping metal with compressive force and sometimes heat. A blacksmith, for example, places a heated piece of metal on an anvil and delivers repeated blows with a hammer. The hammer in that case is the "die," or the surface that comes into contact with the piece being worked. For larger-scale die-based metalworking, the piece is placed in a forge where machines power the dies, achieving a force and speed much greater than a blacksmith's arm could. In a conventional forge, the dies move in a single direction and generally the workpiece remains in one place. In a rotary forge, dies positioned at an angle to each other move synchronously as the workpiece is rotated, pauses for the hammer strike, and rotates again. Each die is in contact with the workpiece for less time, the dies generate less friction between each other, and less downward force is required.

With less force in play, the dies and the machine last longer since they're not subject to as much wear and tear. Rotary forging also requires fewer raw materials and generates less "flash" (metal waste), because of the multiple, more maneuverable ways to deliver force. You can do more things more efficiently when you have hammers that can strike at an angle, as compared to the straight up-and-down force of the single blacksmith's hammer. Rotary forging is thus more efficient than the conventional method—which justified the initial high cost of acquiring the forge at Watervliet.

put it, to use more multitalented job categories. Now all employees are classified as metal processors and are cross-trained in all the critical skills to operate the forge, creating a flexible, diversified pool of workers less vulnerable to individual departures.

Being open to the changes and compromises that a full partnership demands has yielded other benefits for Watervliet. The arsenal's equipment has been upgraded and is maintained by a partner with equal incentive to keep it in shape, and can move faster to keep it up to date. "Electralloy can make investments much

more readily than we can," Turcotte noted. And since becoming an on-site presence at one part of the arsenal, Electralloy has identified other equipment that wasn't being used. "Now we're looking at expanding work downstream on machining," Turcotte said, which means even more skills retained and work gained. "That's a totally unexpected benefit that wasn't in our analysis [of the initial proposal]."

### CONCLUSION

In 2015, the arsenal renewed the partnership with Electralloy for 20 years. DOD recognized the Watervliet-Electralloy





partnership as a “best of breed” exemplar of public-private cooperation at the 2015 DOD Maintenance Symposium in Phoenix, Arizona. Both are strong indicators that the partnership is working well for both sides.

The key indicator, though, is that the partnership solved the skills-retention problem, with the jump from five to 20 employees and increased workload. The arsenal’s headquarters, however, initially evaluated the success of the partnership based on its effect on the arsenal’s revenue. Revenue did go up, but that wasn’t the main goal. So higher-ups weren’t getting the full picture of the partnership’s success. Turcotte and Rudolph are working to change that.

“After we won the DOD best of breed [award], we told everyone who would listen that this wasn’t a revenue thing,” Turcotte said. Watervliet’s headquarters has recently started to evaluate the partnership based on its effect on skills sustainment and readiness—harder to quantify, but in the end the most important measure.

*For more information, contact John Snyder at [john.b.snyder.civ@mail.mil](mailto:john.b.snyder.civ@mail.mil) or visit the arsenal on Facebook at <https://www.facebook.com/WatervlietArsenal>.*

*MS. MARY KATE AYLWARD provides contract support to the U.S. Army Acquisition Support Center (USAASC). A writer and editor at SAIC with eight years’ experience in communications, writing and editing on foreign policy, political and military topics, she holds a B.A. in international relations from the College of William & Mary.*



#### CAUTION: CONTENTS MAY BE HOT

Metal processor Matthew Briscoe removes 155 mm howitzer tubes from an Electralloy furnace. Watervliet also produces the 120 mm Abrams tank gun and 60 mm and 81 mm mortars. The arsenal is reaping the benefits of a public-private partnership that helped strengthen its workforce and level its workload.



#### PARTNERSHIP FUNDS UPGRADE

One of the benefits of the arsenal’s public-private partnership with Electralloy was a major maintenance upgrade to this rotary forge. Electralloy funded the maintenance contract for the March 2016 upgrade.





#### DEVELOPING TOP-LEVEL TIES

Secretary of Defense Ash Carter meets with Amazon CEO and founder Jeff Bezos in Seattle March 3, as part of his ongoing efforts to strengthen ties between DOD and the tech community. (Photo by Navy Petty Officer 1st Class Tim D. Godbee, Office of the Secretary of Defense (OSD) Public Affairs)





# ONE 'PECULIAR' FELLOWSHIP

An Army acquisition officer assigned to a stint with Amazon sees firsthand where the consumer giant's corporate values and those of the military merge and diverge.

*by Lt. Col. Steven D. Gutierrez*

**H**ow does it sound to hang up your military uniform, slip into something more casual, challenge convention and maybe even take your dog to work, all while immersing yourself in one of the world's leading technology and innovation companies? That may sound too peculiar to be possible, but "peculiar" is exactly how Amazon.com Inc. likes to think of itself.

The Amazon Military Talent Partnership group runs a portfolio of military fellowship programs to provide just that kind of opportunity. For some service members and veterans, working at Amazon is a special career-broadening assignment; for others, it is an extended job interview, an unparalleled opportunity to transition seamlessly from military service to a second career with an industry juggernaut.

At Amazon, the hustle of activity creates a sense of being at the center of the business universe. The company has reshaped global consumer behavior and expectations by pioneering innovation and inventing technology. A list of Amazon products and services is extensive: Fire TV, Echo with Alexa Voice Service, one-click shopping, Marketplace, Prime, Prime Now, Prime Air, Prime Pantry and Fresh, to name just a few. It is the fastest company to reach the milestone of \$100 billion in annual sales and continues to expand its network of fulfillment centers, data centers, supporting supply chain and transportation infrastructure at blistering speeds. The net result is to ensure delivery of almost anything a consumer may desire, sometimes within moments.



It is hard to imagine the company's humble beginning in 1994, when founder and CEO Jeff Bezos, recognizing the potential of e-commerce, entered the emerging online marketplace by selling books—just books—from the garage of his rented house in Seattle, Washington. Today, Amazon sells an estimated 500 million products and is by far the largest private employer in Seattle, having invested more than \$4 billion to date to create a constellation of more than 30 corporate campus-style buildings. By 2021, Amazon's transformation of the city skyline will be complete, with more than 10 million square feet of office space available to support a workforce of 55,000. The workforce is the heart of the ubiquitous corporate behemoth that seems to disrupt, if not dominate, most market spaces it chooses to enter.

## DAY ONE

Joining Amazon's ranks, I hit the ground running, as expected, in summer 2015 and never stopped throughout my year as an Army Acquisition Corps Training with Industry (TWI) fellow. My education, training and experience in military operations and acquisition provided a solid point of departure into unfamiliar territory. Indoctrination began at a million-square-foot fulfillment center in Phoenix, Arizona. There, the company introduces its "new hire" leaders to Amazon's mission, principles, culture and business model. I would also work shifts as a fulfillment center associate, a member of a team receiving, storing, picking and shipping inventory. The grueling labor leaves a lasting impression meant to shape operational and strategic decision-making to consider workforce impacts, a lesson Army Acquisition Corps leaders should heed.

My fellowship's all-access pass into different business segments provided me

FIGURE 1



## THE 'VIRTUOUS CYCLE'

The foundation of Amazon's business model is a diagram that founder and CEO Jeff Bezos drew on a napkin, now framed and hanging on a wall in his office. It has shaped the company's vast array of business categories across the virtual and physical domains, and has been studied by other companies worldwide. (SOURCE: USAASC, based on the sketch by Bezos)

a front-row seat to witness, experience and participate in calculated business endeavors that only a company of Amazon's scale—the size of an army—would dare. As a procurement manager during my TWI assignment, I designed and implemented vendor qualification systems and performance metrics for a \$500 million annual spend category. My previous experience as a contracting specialist and officer conducting contract life cycle management greatly benefited the company. As a project manager at Amazon, I led the request for proposal on a project of CEO interest to fully automate fulfillment centers through robotic and

mechatronic technology. (Mechatronics is a field combining multiple engineering disciplines to create "smart" devices, such as anti-lock brakes, robots and photocopiers.) I gained an appreciation for thoroughly analyzing return-on-investment (ROI) projections before making capital investment decisions. While there are always exceptions, aggressive ROI figures more often than not are telltale indications of revolutionary and disruptive technology.

I discovered that every project followed a surprisingly elegant and straightforward business model. This model has proven



*In this spirit of innovation, Carter has proposed Force of the Future talent management initiatives that depart dramatically from the status quo. No longer is the up-or-out officer promotion system sacrosanct, as DOD explores more flexible career tracks.*

remarkably repeatable and relevant in vastly different business categories that span the virtual and physical domains, from e-commerce and cloud computing services to the Kindle and Fire tablet product lines. As legend has it, Bezos conceived the business model on a napkin. The scribbled-on, now framed napkin hangs on a wall in Bezos' sixth-floor office on Amazon's corporate campus. (See Figure 1.) The drawing is a flywheel diagram referred to as the "virtuous cycle." At the center of the flywheel is growth, around which are selection, customer experience, traffic and sellers. Directly connected to growth is lower cost structure, which leads to lower prices, which feed back into the customer experience.

In a little over two decades, Amazon's strategy of creating unrivaled economies of scale and ruthlessly pursuing efficiencies has catapulted the company to dizzying heights. Despite the exponential growth, market indicators suggest that this is only the beginning. That sense of a perennially new beginning creates a feeling that every day is day one for Amazon. This launch-day type of energy permeates all levels of the company, even after 20-plus years of endeavoring to be Earth's most customer-centric company. All the while, the Army and its Acquisition Corps battle complacency, in part by placing select members of the workforce in positions to leverage lessons learned from the best companies in industry to

ensure the continued distinction of fielding the best-equipped fighting force in the world.

### MANAGING TALENT TO SHAPE 'AMAZONIANS'

Talent management, an increasingly prominent theme in Army acquisition, is especially vital to filling Amazon's expanding ranks as the company grows with its market share—from 30,000 employees in 2010 to over 230,000 in 2016. Recruiting, retaining and developing human capital, while imbuing the expanding workforce with the mindset that it is still day one, is no simple task in the technology space. Within the tech industry, specialists in the science, technology, engineering and mathematics fields are scarce and in high demand. Attracting the best in the human resources, marketing, program management and procurement disciplines is also fiercely competitive.

Like the company's business model, Amazon's leadership principles pervade day-to-day operations and shaped my initial expectations. Dialogue with my director touched on tasks related to each. Amazon seeks to draw and develop employees who share these principles:

- Customer obsession.
- Ownership.
- Invent and simplify.
- Are right, a lot.

- Learn and be curious.
- Hire and develop the best.
- Insist on the highest standards.
- Think big.
- Bias for action.
- Frugality.
- Earn trust.
- Dive deep.
- Have backbone; disagree and commit.
- Deliver results.

If these leadership principles seem a lot like the core values of military personnel, they are. The parallels are not lost on Amazon recruiters, either, as they develop comprehensive initiatives to attract, recruit and develop military talent. Colby Williamson, a Marine Corps veteran and recruiting manager with Amazon, believes that, "Regardless of someone's military occupational specialty, branch or rank, the leadership skills developed while in the armed forces closely resemble Amazon's 14 leadership principles.

"At Amazon, we look for leaders who are customer-centric, have a bias for action and think outside the box. Our culture is fast-paced, and our leaders are given a lot of ownership to make business decisions. This makes for a natural fit for military leaders, where they can also find a strong sense of belonging with their peers." Amazon believes that military personnel who live by an ethos of loyalty, duty, respect, selfless service, honor and integrity already mirror Amazonian dogma.

### HOW THE EXCHANGES BEGAN

The genesis for military personnel exchanges with industry was a critical requirement to establish officers with skills reflecting particular industrial practices and procedures that are necessary in materiel acquisition and logistics leaders. In response, DOD and its branches of service developed relationships with companies in the military-industrial

complex that could help fill the void that military and civilian curricula could not fill, and could host officers for training assignments.

Currently, military assignments in the corporate world include the Secretary of Defense Corporate Fellows Program, the Army's Training with Industry, the Air Force's Education with Industry and, as of October 2015, the Navy's Tours with Industry, with varying requirements for participation. Ideally, these cohorts will be strategically placed in follow-on assignments that make the most of their newly acquired higher-level managerial techniques and in-depth understanding of private-sector business methods to help the government collaborate and conduct business with industry more effectively. (For a U.S. Army Acquisition Support Center perspective on the TWI program, see "Shrinking the Divide," Page 152.)

For example, military fellows assigned to Amazon are exposed to a commercial business culture that shuns PowerPoint presentations in favor of narrative white papers. Juan Garcia, formerly assistant secretary of the Navy for manpower and reserve affairs and now director of associate career development with Amazon, acknowledged that, "It's one of Amazon's many cultural norms that vary sharply from traditional Pentagon practices." Favoring substance over style, Amazon believes that written documentation is better for decision-making, forcing organization of thought, avoiding misinterpretation and generating thoughtful inquiry from a better-informed audience.

Capt. Matthew Getts, an Air Force Education with Industry fellow, worked with Amazon Transportation Services and was impressed with the company's ability to harness "big data" and automation to make more informed decisions. "Metrics



### MEETING THE BOSS

Carter meets Frederick Thomas, a Marine veteran now working for Amazon, during a visit March 3 to company headquarters in Seattle. Next to Thomas is Marine Corps Brig. Gen. Eric M. Smith, Carter's senior military assistant. Carter has taken a keen interest in forging ties with the tech industry, becoming the first secretary of defense in 20 years to tour Silicon Valley. (DOD photo by Navy Petty Officer 1st Class Tim D. Godbee, OSD Public Affairs)

were automated, at the \$0.01 level of granularity, and with changes expressed in basis points (one-hundredth of 1 percent)," Getts said. "This data is packed into a six-page narrative and reviewed by the team together. This approach enables near-real-time informed decisions and cuts out unnecessary information that slows down decisions."

The content of white papers is often dense, heavy on business analytics and light on anecdotal material. Consequently, military fellows assigned to Amazon tend to return to the government with expertise in presenting actionable information. In exchange, the company gains a seasoned military leader providing an exclusive perspective on projects and programs from the "other side." As the government expands its business with Amazon Web Services for cloud computing services, this will become increasingly critical.

These mutually beneficial exchanges are expanding and evolving as both officers and enlisted personnel participate in fellowships with corporations in the world of technology beyond the confines of the military-industrial complex. The intent is that the fellowships be exchanges, with industry partners scheduled to send participants to government agencies.

### TODAY'S FORCE OF THE FUTURE

The nascent military associations with Amazon reflect Secretary of Defense Ash Carter's ambition to collaborate rather than compete with industry for the talent pool of free-thinking innovators. It is just that kind of thinking, outside the "five-sided box," that the secretary of defense believes will help prevent conflict, shape security environments, win wars and maintain our military's superiority in this complex world.





### JOINING WITH INDUSTRY

After meeting with military fellows working at Amazon, Carter takes questions from the media March 3 during a news conference at Amazon headquarters. Carter also has visited Silicon Valley several times in the past year. Carter aspires to collaborate, not compete, with the tech industry to attract the talent pool of innovative thinkers. (Photo by Navy Petty Officer 1st Class Tim D. Godbee, OSD Public Affairs)

In this spirit of innovation, Carter has proposed Force of the Future talent management initiatives that depart dramatically from the status quo. No longer is the up-or-out officer promotion system sacrosanct, as DOD explores more flexible career tracks. The proposals include technical career paths, lateral entry into the military at a rank reflecting one's former corporate status, expanded opportunities and incentives for officers and senior noncommissioned officers to attend Advanced Civil Schooling, as well as sabbaticals with industry.

Carter also has made it a point to shore up and build new bridges between DOD and the nation's innovation and technology community. He has visited Silicon Valley several times in the past year, in the first such goodwill tours by a sitting secretary of defense in 20 years. On a trip in April, Carter courted technology

companies to collaborate with DOD on national security concerns.

To establish inroads, bilateral personnel exchanges and lasting partnerships, in March he established a Defense Innovation Advisory Board. The board, led by Eric Schmidt, executive chairman of Google Inc. parent company Alphabet Inc., comprises 12 business operation leaders, all industry experts in organizational change by way of technology adoption. The board advises the department on organizational information sharing, mobile and cloud applications, iterative product development, rapid prototyping and sophisticated data analysis in business decision-making.

As part of these efforts, Carter visited Amazon's corporate offices in Seattle in March, meeting with Bezos and his executive team. Carter then met with the

active-duty Air Force, Army and Navy military fellows assigned to Amazon, underscoring at a subsequent news conference that they are today's force of the future. Participating in the events of that day was a highlight of both my TWI fellowship and my Army career.

### CONCLUSION

Amazon uses several military fellowship programs specifically to provide transition opportunities for separating service members. Amazon Military Talent Partnership recruiters work with the Service Member for Life Transition Assistance Program to identify eligible separating service members and help them negotiate the very challenging interview process. They also help veterans translate their military skills into marketable equivalents on their resumes. While the company has long sought junior military officers for leadership roles in its fulfillment centers,

*That sense of a perennially new beginning creates a feeling that every day is day one for Amazon. This launch-day type of energy permeates all levels of the company.*

newly established programs cast the net even wider, looking to hire veterans of all ranks into various functional disciplines.

In 2015, for example, Amazon participated in the Camo2Commerce program, an initiative between several western Washington employers and Joint Base Lewis-McChord, Washington. The program accepted highly qualified military personnel who were in the process of separating to participate in a 12-week fellowship with Amazon while still on active duty. The fellows worked in operations, recruiting, facilities or Amazon Web Services with the possibility of earning a full-time position.

The program costs participating companies nothing and provides an employment opportunity for military candidates who otherwise might not make it through the stringent requirements of initial hiring. At the same time, it allows both parties, the business and the candidate, to thoroughly vet each other. The Camo2Commerce program's first three Amazon cohorts consisted of a total of 12 military fellows and resulted in a 75



#### A VISIT FROM LEADERSHIP

Lt. Gen. Michael E. Williamson, center, principal military deputy to the assistant secretary of the Army for acquisition, logistics and technology, meets with military fellows assigned to Amazon on Feb. 26: from left, Navy Lt. William Hall, the author, Navy Lt. Niki Elizondo, then-Lt. Col. William Fairclough and Air Force Capt. Matthew Getts. During the same visit to company headquarters in Seattle, Williamson, director of the Army Acquisition Corps, met with Amazon leadership and presided over Gutierrez' promotion ceremony. (Photo by Jon Kaplan, Jon Kaplan Photography)

percent hiring rate, with eight accepting full-time positions.

In 2016, Amazon embarked on a partnership with the U.S. Chamber of Commerce's Hiring Our Heroes initiative, substantially expanding the fellowship opportunities for transitioning to the company with the addition of four locations: Washington, D.C.; Fort Hood, Texas; Fort Huachuca, Arizona; and Fort Campbell, Kentucky. In the boldest pledge yet to hire talent from the military community, Bezos and first lady Michelle Obama in May announced a partnership in which Amazon committed to hire 25,000 additional veterans and military spouses over the next five years. The military's loss can be a big gain for companies like Amazon.

For more information about the Amazon Military Talent Partnership, go to <http://www.amazonfulfillmentcareers.com/opportunities/military/> and <http://amazondelivers.jobs/about/military/>;

about the Camo2Commerce program, <http://camo2commerce.com/>; about the U.S. Chamber of Commerce Foundation's Hiring Our Heroes initiative, <https://www.uschamberfoundation.org/hiring-our-heroes>; and about DOD's proposed Force of the Future initiatives, [http://www.defense.gov/Portals/11/features/2015/0315\\_force-of-the-future/documents/FotF\\_Fact\\_Sheet\\_-\\_FINAL\\_11.18.pdf](http://www.defense.gov/Portals/11/features/2015/0315_force-of-the-future/documents/FotF_Fact_Sheet_-_FINAL_11.18.pdf).

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*LT. COL. STEVEN D. GUTIERREZ, a U.S. Army Training with Industry Fellow with Amazon.com Inc. from July 2015 to June 2016, is a member of the Army Acquisition Corps and is Level III certified in contracting and program management. He holds an M.S. in management, acquisition and contract management and a master of public administration degree from the Florida Institute of Technology, and a B.S. in criminal justice administration from San Diego State University.*

*[Amazon's] workforce is the heart of the ubiquitous corporate behemoth that seems to disrupt, if not dominate, most market spaces it chooses to enter.*

# RECOGNIZING THE BEST



Army AL&T magazine leads fourth annual writers workshop and ALTies awards ceremony.

*by Ms. Ashley E. Tolbert*

The Army AL&T magazine editorial team held its fourth annual writers workshop May 11 at Fort Belvoir, Virginia, including interactive forums and guest speakers—all focused on helping magazine contributors develop and share substantial and meaningful articles, photos, ads and graphics.

The workshop closed with the announcement of the winners of its annual “ALTies” awards, presented by Editor-in-Chief Nelson McCouch III. The ALTies celebrate the best article, commentary, graphic, ad and photograph published in the magazine in the past year.

“In a way, we’re like PBS,” McCouch said. “The magazine is made possible by contributions from supporters like you.’ Without you, I’d have a staff of writers, but not the access to the content for meaningful, impactful stories. Actually, that’s why I created the workshop and the awards.”

Winners of this year’s ALTies are:

## BEST ARTICLE

### Winner: “Keeping Design on Target”

Dr. Gabriella Brick Larkin, U.S. Army Research Laboratory Human Research and Engineering Directorate; Mr. Joshua Charm, Program Executive Office (PEO) for Soldier; Maj. Aron Hauquitz, U.S. Special Operations Command; and Maj. Adam Patten, U.S. Army Maneuver Center of Excellence.

October – December 2015



## KNOWLEDGE SHARING

James Christophersen, left, and Katie Morgan, center, both from the Program Executive Office for Enterprise Information Systems (PEO EIS), discuss the evolution of an article submitted to Army AL&T magazine with Peggy Roth, editor, and Steve Stark, senior editor. (Photos by Catherine DeRan, U.S. Army Acquisition Support Center (USAASC))





### HONORING EXCELLENCE

Roger Teel, public affairs specialist from the U.S. Army Research, Development and Engineering Command (RDECOM), left, accepts the award for best commentary on behalf of Maj. Gen. John F. Wharton, RDECOM commanding general, from Army AL&T Editor-in-Chief Nelson McCouch III.



### GATHERING INPUT

Ellen Crown, public affairs officer with the U.S. Army Medical Materiel Agency, asks a question during the workshop, which included sessions on the elements of great photos and stories and a rundown of the AL&T editing process.



### JOB WELL DONE

PEO EIS was one of two organizations to receive runner-up honors for best advertisement at this year's ALTies Awards. Katie Morgan accepted the award from McCouch on behalf of PEO EIS.

### Runner-Up: "Ground Truth"

Ms. Gail Cayce-Adams, U.S. Army Materiel Systems Analysis Activity.  
April – June 2015

### BEST COMMENTARY

#### Winner: "From STEM to Employment"

Maj. Gen. John F. Wharton, commanding general, U.S. Army Research, Development and Engineering Command.  
October – December 2015

#### Runner-Up: "The Professionals Behind Program Success"

Lt. Gen. Michael E. Williamson, principal military deputy to the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)) and director, acquisition career management.  
October – December 2015

### BEST PHOTO

#### Winner: "The True Measure of Success"

Mr. Sam Ortega, U.S. Army Research Laboratory.  
October – December 2015

#### Runner-Up: "Systems Integration"

Ms. Vanessa Flores, System of Systems Engineering and Integration Directorate, ASA(ALT).  
July – September 2015

### BEST GRAPHIC

#### Winner: "Common-Sense Architecture"

U.S. Army Communications-Electronics Research, Development and Engineering Center.  
January – March 2016

#### Runner-Up: "Cyber Mindset"

PEO for Command, Control and Communications – Tactical.  
January – March 2015

### BEST ADVERTISEMENT

#### Winner: "Connecting the Global Army"

PEO for Enterprise Information Systems (PEO EIS).  
October – December 2015

#### Runner-Up (Tie): "CHESS: Shopping for Software?"

Computer Hardware, Enterprise Software and Solutions, PEO EIS.  
July – September 2015

#### Runner-Up (Tie): "Want to Improve Performance of Your Laser Target Locator?"

Product manager for Soldier precision targeting devices, PEO Soldier.  
January – March 2015

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*MS. ASHLEY E. TOLBERT provides contracting support to USAASC for Network Runners Inc. She holds a B.A. in communication from George Mason University. She has written for the Army AL&T news blog and on a variety of technical topics, including naval energy and environmental issues.*



## CAREER CORNER

# A PEEK BEHIND the CURTAIN

An analysis of the FY17 project manager  
and product manager selection board.

*by Ms. Tara Clements*

**A**pril turned out to be a record-breaking month for the Army Acquisition Corps. One civilian was selected as primary for project manager and six as primaries for product managers—the highest number of civilians ever selected in the competitive centralized selection board.

The announcement marked a significant milestone for civilians, whose names increasingly are listed among military counterparts who traditionally dominated these positions. Of the more than 36,000 Army Acquisition Workforce (AAW) professionals, civilians represent over 94 percent of the population, while those in the military (both commissioned and noncommissioned officers) make up just a little over 5 percent.

And while the number of civilians selected may not seem that large, a closer look at the results is telling. Eighty-two civilians applied for FY17 project or product manager positions, and the quality of applications greatly improved from previous years, according to the Army Director for Acquisition Career Management (DACM) Office.

Here's the breakdown: 31 civilians competed to be the best qualified for 14 positions in the GS-15/colonel project

manager board. While the board selected one civilian as a primary, 12 were selected as alternates—making up 39 percent of the alternate list. In the case of the GS-14/lieutenant colonel product manager board, 51 civilians competed for 34 positions, resulting in six primaries and 27 alternates, or 35 percent of the alternate list.

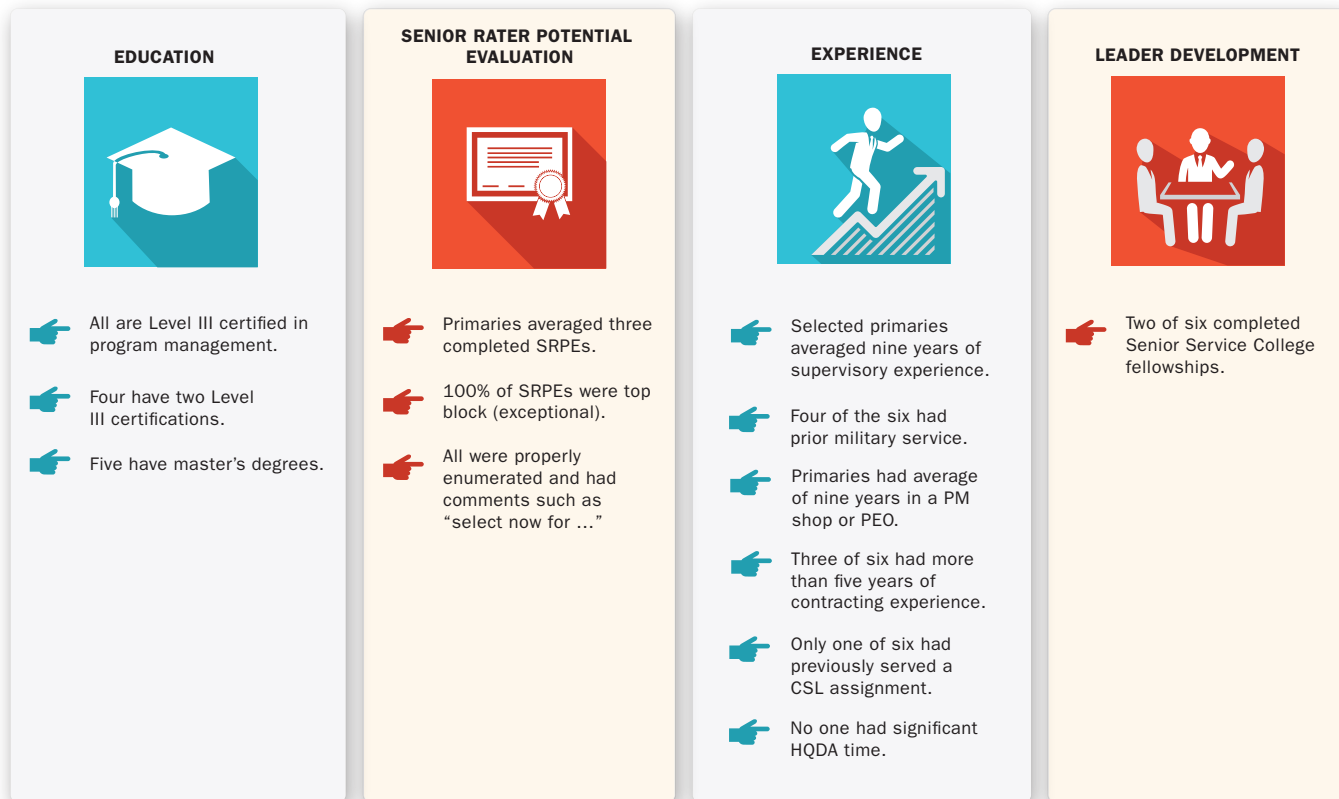
So why now? What's changed for the civilian workforce?

The Army DACM Office, an element of the U.S. Army Acquisition Support Center (USAASC), set out to answer those questions, analyzing the data and identifying trends associated with the Army's newest project and product managers. For those who have ever wondered what tipped the scales to determine why someone was selected, this analysis may lend some insight and help future candidates develop stronger, more competitive applications.

Some of the success can be attributed to several administrative changes that the Army DACM Office made to the application process this year, resulting in noticeable differences for the board from previous years.

"We streamlined several processes this year, really allowing the best applications to shine through," said Scott Greene,

FIGURE 1



### PRODUCT MANAGER SELECTEES, IN PROFILE

In examining the backgrounds of the six primaries selected as GS-14 product managers, the Army DACM Office identified significant trends in four key areas. (SOURCE: USAASC)

the Army DACM Leader Development Branch chief, who led the centralized selection list (CSL) application process. To make sure all of the applications were consistent and comparable, he reduced the number of required documents, standardized the application template and provided detailed feedback to every applicant, providing the opportunity to revise and resubmit the application before it went forward.

Civilian applications have to be manually converted into the DA format, causing a variety of format issues in previous years. John Kelly, Army DACM Office acquisition data management specialist, spent

hours ensuring that the civilian files transferred without any quality degradation, allowing the review board to see clean civilian application documents. In earlier years, files went straight to the board without review, and some were illegible or completely blacked out. Greene changed that so that the Army DACM Office can identify formatting errors and get them fixed in advance.

But a key contributor to the quality of applicants this year comes straight from the top. As the Army DACM, Lt. Gen. Michael E. Williamson has made talent management one of his key priorities for the AAW since 2014, and he has

implemented several initiatives to help leaders identify and develop talent. They seem to be working. Not only is Williamson focusing on increasing the acumen and competitiveness of the civilian population, one of his initiatives specifically calls for leaders to encourage talented professionals to apply for CSL positions. "My goal is to create a pool of the right people with the right skills for the right jobs," he said in a video outlining his talent management priorities for the AAW.

### WHAT'S TRENDING

An analysis of the six primaries selected as GS-14 product managers highlighted significant trends in four key areas:





education, evaluations, experience and leader development. (See Figure 1.)

In education, all six selected primaries are Level III certified in program management, four have two Level III certifications and all but one have master's degrees.

Greene, who not only reviewed each application but also observed the board process, noted that when it came to evaluations, the Senior Rater Potential Evaluation (SRPE) carries the most weight. "The higher the senior rater, the better," said Greene. "Some applicants had an NH-03 [GS-13/14 equivalent] senior rater, but they should really have a GO [general officer] or SES [Senior Executive Service member] to be more competitive."

The primaries averaged three completed SRPEs in their application. Greene noted that while not a requirement, multiple SRPEs with an exceptional rating stand out more than someone who doesn't have an SRPE history. Collectively, all of the SRPEs were exceptional and specified

contributions, including direct comments such as "select now for ..." Greene added: "Senior raters need to quantify or enumerate where the person is in relation to others to demonstrate the applicant's potential to a board."

When it comes to experience, Greene said that the board is looking for leadership potential and consistent demonstrated past performance through a diversity of experience. A review of the primaries selected revealed an average of nine years of supervisory experience and time in a program executive office (PEO) or program manager (PM) shop for each primary. Two of the primaries did not have prior military experience, countering a common perception among the workforce that only those with prior service are competitive. Half of them have over five years of contracting experience, one previously served in a CSL assignment and no one had any significant time working at HQDA.

As for leader development, two of the selectees completed the Defense Acquisition University Senior Service College Fellowship. According to Greene, here's why that's important: If a civilian has Senior Service College under their belt, it provides a competitive edge for a GS-14 over the lieutenant colonel counterparts because military applicants don't have a chance to attend until they are a colonel.

#### ON THE HORIZON: FY18 APPLICATION SEASON

Greene plans to keep improving the process for the FY18 CSL application. "For the upcoming application, we'll provide an updated resume template and a more user-friendly regional preference form with only available locations listed. We'll also have the 1-N list of positions included in the application this year as well."

As for other tips from Greene on how to increase the strength of an application, he stressed the importance of three key items:

- Make sure your resume and Acquisition Career Record Brief match.
- Focus your resume succinctly on cost, schedule and performance. Don't make the board members hunt for it!
- Have a mentor or your senior rater go over your entire CSL application with you prior to submitting. The Army DACM Office is available to give you a sanity check, too; however, you should always engage a second set of eyes before submitting.

#### CONCLUSION

For those who have been on the receiving end of the "unfortunately, you were not selected" notices, how your application stacked up against others isn't always clear—but understanding the trends associated with those who were selected can be helpful. And while the Army DACM Office isn't promising a recipe for success, these trends and tips demonstrate what's been working for others, and likely things for future applicants to keep in mind.

*The GS-14 CSL announcement is set to open Aug. 1 and the GS-15 on Aug. 15. For additional information, go to the CSL page on the USAASC website at <http://asc.army.mil/web/centralized-selection-list/>.*

*MS. TARA CLEMENTS is USAASC's public affairs specialist and the Army ALE&T News editor. She holds a B.A. in public relations from Radford University and has 14 years of Army public affairs experience.*

*Of the more than 36,000 Army Acquisition Workforce professionals, civilians represent over 94 percent of the population.*

# ON THE MOVE

## RUSSELL TO SERVE AS ACTING DASA(R&T)

U.S. Army Research Laboratory (ARL) Director **Dr. Thomas Russell** has been detailed to serve as the acting deputy assistant secretary of the Army for research and technology (DASA(R&T)). Russell replaces **Mary J. Miller**, DASA(R&T) since 2013, who was recently named as the principal deputy assistant secretary of defense for research and engineering.

Russell's new assignment began in late April, and he anticipates serving in the role for four to six months. In his absence, **Dr. Philip Perconti** will act as ARL director. Perconti has served as director for the ARL Sensors and Electron Device Directorate since March 2013.



Mary J. Miller



Dr. Philip Perconti



Dr. Thomas Russell



## COLE DEPARTS PEO MS

**Barry Pike**, program executive officer (PEO) for missiles and space (MS), presented **Brig. Gen. William E. Cole**, former deputy PEO for Missiles and Space, with a memento at a farewell luncheon May 11 in Huntsville, Alabama. Cole is now serving as the PEO for simulation, training and instrumentation (STRI), having assumed the leadership at a June 16 change of charter ceremony. Cole succeeds **Maj. Gen. Jonathan A. Maddux** as PEO STRI. Maddux is retiring after 40 years of service to the Army. (Photo by Chris Geisel, PEO MS)



## NEW PROJECT DIRECTOR AT ENTERPRISE SERVICES

**Thomas Neff** was introduced as the new project director for enterprise services (ES), part of the Program Executive Office for Enterprise Information Systems (PEO EIS), during a May 13 ceremony hosted by acting PEO EIS **Terry Watson** at Fort Belvoir, Virginia. Neff takes over from acting Project Director Doug Haskin.

Neff most recently served as the product lead for Computer Hardware, Enterprise Software and Solutions, also within PEO EIS. In addition to his duties at PEO EIS, Neff is assigned to the Army Reserve Element of the assistant secretary of the Army for acquisition, logistics and technology. Haskin resumes his role as deputy project director at ES, a position he had held since November 2012. (Photo by Racquel Lockett-Finch, PEO EIS)





## TOP-LEVEL CHANGES AT TACOM LCMC

**Maj. Gen. Gwendolyn Bingham**, far right, relinquished command of the TACOM Life Cycle Management Command (LCMC) and the Detroit Arsenal in Warren, Michigan, to **Maj. Gen. Clark W. LeMasters Jr.** in a May 2 ceremony at the arsenal. **Gen. Dennis L. Via**, commanding general of the U.S. Army Materiel Command (AMC), presided over the ceremony and presented the TACOM LCMC colors to LeMasters. TACOM is a subordinate command to AMC.

Before assuming command, LeMasters served as AMC's deputy chief of staff for logistics and operations at Redstone Arsenal, Alabama. Bingham had commanded the installation since June 2014 and was its first female commander. She was awarded the Distinguished Service Medal at the May 2 ceremony. She previously served as commanding general of the White Sands Missile Range, New Mexico; her next assignment has yet to be announced.



Brian D. Butler

**Brian D. Butler** has been appointed as the deputy to the TACOM LCMC commander, effective April 17. Butler had served as the interim deputy since last fall. A member of the Senior Executive Service since January 2011, he previously was executive director of the TACOM LCMC Integrated Logistics Support Center. A retired lieutenant colonel and combat veteran of Operations Joint Endeavor and Iraqi Freedom, Butler has served at various levels of command, including deputy assistant chief of staff for logistics for the 1st Armored

Division and commander of the Sierra Army Depot, California. (U.S. Army photos by Jerry Aliotta, U.S. Army Tank Automotive Research, Development and Engineering Center)



## FARMEN TAKES COMMAND AT USASAC



**Brig. Gen. Stephen E. Farmen** took command of the U.S. Army Security Assistance Command (USASAC) during a June 2 ceremony on the U.S. Army Materiel Command (AMC) Parade Field at Redstone Arsenal, Alabama. The change of command was hosted by **Gen. Dennis L. Via**, AMC commanding general. Before joining USASAC, a subordinate command to AMC, Farmen commanded the Joint Munitions and Lethality Life Cycle Management Command and the Joint Munitions Command at Rock Island, Illinois.

## KELLY NAMED PRODUCT LEAD FOR ENTERPRISE COMPUTING

**Dennis Kelly**, right, received the charter for the product lead for enterprise computing (PL EC) within the Program Executive Office for Enterprise Information Systems (PEO EIS) from **Doug Haskin**, center, then acting project director for enterprise services, during a May 13 change of charter ceremony at Fort Belvoir, Virginia. Kelly has been with PEO EIS since 2011 and in EC since its inception, serving as project officer and helping to build the capabilities of the Army Enterprise Service Desk – Worldwide and facilitating the use of the Army Private Cloud contract. Kelly takes over from acting PL EC **Keith Baylor**, left, who will now serve as deputy PL. (Photo by Racquel Lockett-Finch, PEO EIS)





## NEW FACES AT PEO C3T



**Col.(P) Karl H. Gingrich** will join the Program Executive Office for Command, Control and Communications – Tactical (PEO C3T) this summer as the assistant PEO for operations, readiness and fielding.



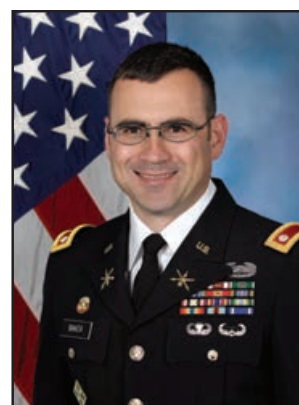
**Col. Troy W. Crosby** is the incoming project manager for mission command in PEO C3T. Crosby previously served as the executive officer for **Lt. Gen. Michael E. Williamson**, the principal military deputy to the assistant secretary of the Army for acquisition, logistics and technology.



**Lt. Col. Shane D. Sims** has been named product manager for Joint Battle Command – Platform. Since March 2015, Sims served as military deputy for the Command, Power and Integration Directorate at the U.S. Army Communications-Electronics Research, Development and Engineering Center at Aberdeen Proving Ground (APG), Maryland.

## BAKER REPLACES GARY AT PEO C3T

**Lt. Col. Rayfus J. Gary** passed the charter for the Hand-held, Manpack and Small-Form Fit program within the Program Executive Office for Command, Control and Communications – Tactical to **Lt. Col. Michael A. Baker** during a June 15 ceremony at APG.



## NEW PRODUCT MANAGER AT GCSS-ARMY

In an April 14 ceremony at Fort Lee, Virginia, **Col. Harry R. Culclasure**, project manager for the Army Enterprise Systems Integration Program, presented the charter of the product manager for the Global Combat Support System – Army (GCSS-A) to **Robert Zoppa**, the former deputy, who will serve as the acting product manager until board-selected replacement **Lt. Col. Preston J. Hayward** arrives later this year. Zoppa took over the post held by **Lt. Col. Christopher J. Romero**, who served as acting product manager for three years. (Photo by Sherrel Satterthwaite, GCSS-A)



## MERCER TAKES OVER AT JTNC

**Gary Martin**, center, the program executive officer for C3T, passed the Joint Tactical Networking Center (JTNC) flag to incoming Director **James J. "Jeff" Mercer** during a transfer of responsibility ceremony April 4 in San Diego, California. Mercer takes the post previously held by **William R. "Russ" Wygal**, right, who received a Superior Civilian Service Award and other recognition during the ceremony. **Lt. Col. Matthew Jury**, center back, will move to Mercer's former post as deputy director. PEO C3T has executive oversight of JTNC. (Photo by Ashley Buzzell, JTNC)



## CASTILLO IS ACC'S NEW TOP ENLISTED ADVISER

**Maj. Gen. James E. Simpson**, left, commanding general of the U.S. Army Contracting Command (ACC), passes the ACC flag to incoming **Command Sgt. Maj. Jose A. Castillo** during a change of responsibility ceremony April 19 at Redstone Arsenal, Alabama. Castillo is ACC's fourth command sergeant major and succeeds **Command Sgt. Maj. David M. Puig**, who held the position for two years.

Castillo comes to ACC from the 19th Expeditionary Sustainment Command in Korea, where he was also the command sergeant major. Puig, above right, moves to Fort Bliss, Texas, where he will participate in a Pennsylvania State University fellows program and then teach at the U.S. Army Sergeants Major Academy. (Photos by Ed Worley, ACC Office of Public and Congressional Affairs)



## WATSON NAMED TOBYHANNA DEPOT SGM

**Sgt. Maj. Paul A. Watson** has assumed the duties of depot sergeant major at the Tobyhanna Army Depot, Pennsylvania. He'll oversee mission requirements and advise the commander on all matters relating to Soldiers and the civilian workforce. Before his arrival at Tobyhanna, Watson was assigned to the U.S. Army Combined Arms Support Command at Fort Lee, Virginia. His other assignments include posts in Panama, Korea, Germany, Southwest Asia and four stateside assignments. (Photo by Steve Grzedzinski, U.S. Army Communications-Electronics Command)



## USAMMA'S JOHNSON PROMOTED TO CW5

**Chief Warrant Officer 4 Wendell Johnson**, chief of the National Maintenance Program of the U.S. Army Medical Materiel Agency (USAMMA), was promoted to chief warrant officer 5 (CW5), the top warrant officer rank, in a May 6 ceremony at Fort Detrick, Maryland. Army warrant officers are technical experts, combat leaders, trainers and advisers, serving in 17 branches and 67 warrant officer specialties. Johnson is one of only three CW5s in Army medicine. (Photo by Ellen Crown, USAMMA Public Affairs)



## POWERS RETIRES AFTER 37-YEAR CAREER

**Col. Darby McNulty**, project manager for the Integrated Personnel and Pay System – Army, presented **Dr. David Powers** with a certificate recognizing Powers' 37 years of federal service during a March 31 retirement ceremony at Fort Belvoir, Virginia. Powers was the project director for the Force Management System under the Program Executive Office for Enterprise Information Systems (PEO EIS) starting in January 2003. He supported force management business processes at all levels of the Army, having previously worked at the HQDA staff level within G-3/5/7 and at the headquarters of a major command at the U.S. Army Training and Doctrine Command. (Photo by Racquel Lockett-Finch, PEO EIS)



## RDECOM'S HUGHES RETIRES AFTER 28 YEARS

The U.S. Army Research, Development and Engineering Command (RDECOM) honored the 28-year career of **Col. Frederick J. Hughes** during an April 28 retirement ceremony at Aberdeen Proving Ground, Maryland. **Maj. Gen. John F. Wharton**, left, RDECOM commanding general, presented an American flag to Hughes during his retirement ceremony. Hughes arrived at RDECOM in June 2013 and has served as G-3/operations officer, deputy chief of staff, acting chief of staff, and deputy director of programs, engineering and operations. (Photo by Conrad Johnson, RDECOM)



## ZABINSKI NAMED SENIOR MATERIALS SCIENTIST

**Dr. Jeffrey S. Zabinski** was recently named senior research scientist (ST) for materials science at the U.S. Army Research Laboratory (ARL). As the materials science ST, Zabinski is the principal scientific leader for the Army's national and international fundamental materials science and engineering research programs. There are fewer than 50 STs across the Army; they serve as general officer equivalents, advising leadership on science matters.

Zabinski has served as chief of the Materials and Manufacturing Science Division within the ARL's Weapons and Materials Research Directorate since 2011. He came to ARL from the Air Force Research Laboratory, where he served as the chief of the Materials and Manufacturing Directorate's Nonmetallic Materials Division.



## GENERAL OFFICER ANNOUNCEMENTS

*The Chief of Staff, Army announced the following officer assignments:*

**Maj. Gen. Barbara R. Holcomb**, deputy commanding general (CG) for operations, U.S. Army Medical Command and chief, U.S. Army Nurse Corps, Joint Base San Antonio, Texas, to CG, U.S. Army Medical Research and Materiel Command (USAMRMC) and Fort Detrick, Maryland, and chief, U.S. Army Nurse Corps, Fort Detrick.

**Maj. Gen. Brian C. Lein**, CG, USAMRMC and Fort Detrick, to CG, U.S. Army Medical Department Center and School and chief, U.S. Army Medical Corps, Joint Base San Antonio.





# RECOGNIZING ACQUISITION EXCELLENCE

**Nominate individuals and  
teams July 11 – Sept. 2**

## ***ARMY ACQUISITION EXECUTIVE'S EXCELLENCE IN LEADERSHIP AWARDS***

### **Nominate individuals for the following awards:**

- Acquisition Support Professional of the Year
- Business Operations Professional of the Year
- Defense Exportability and Cooperation Professional of the Year
- Engineer and System Integrator of the Year
- Logistician of the Year
- Product Management/Product Director Professional of the Year (O-5 Level)
- Project Management/Project Director Professional of the Year (O-6 Level)
- Science and Technology Professional of the Year

### **Nominate programs for the following awards:**

- Product Management/Product Director Office Team of the Year (O-5 Level)
- Project Management/Project Director Office Team of the Year (O-6 Level)

**The AAE Excellence in Leadership Awards highlight the best people and teams in Army acquisition and how they help their organization and the acquisition community at large.**

*Individual award nominees must occupy an acquisition-workforce designated position and be current in their Defense Acquisition Workforce Improvement Act certification and continuous learning points. Two exceptions: The Defense Exportability and Cooperation Professional of the Year and the Acquisition Support Professional of the Year categories are open to all Army employees supporting the acquisition workforce, subject to the criteria for those categories.*

For nominating criteria, details and submission forms, go to <http://asc.army.mil/web/acquisition-awards/>.

## ***SECRETARY OF THE ARMY EXCELLENCE IN CONTRACTING AWARDS***

### **Recognizing performance and professionalism in individuals and teams who execute the contracting mission worldwide.**

- Installation-Level Contracting Office and/or Directorate of Contracting Award: individual and team/unit nominations accepted
- Systems, R&D, Logistics Support (Sustainment) Contracting Award: individual and team/unit nominations accepted
- Specialized Services and Construction Contracting Award: individual and team/unit nominations accepted
- Contingency Contracting Award: individual and team/unit nominations accepted
- Exceptional Support of the AbilityOne Program Award: individual and team/unit nominations accepted
- Barbara C. Heald Deployed Civilian Award: individual only
- Outstanding Contract Specialist/Procurement Analyst Award: individual only

For nominating criteria, details and submission forms, go to <http://asc.army.mil/web/contracting-awards/>.

**Questions?** Contact Vicky Deguzman at 703-805-1245 or [victoria.l.deguzman.civ@mail.mil](mailto:victoria.l.deguzman.civ@mail.mil).





# NEW SCIENCE CLUB

ARL pairs new Open Campus concept with the CRADA approach dating to the Cold War, to forge and strengthen relationships among government, academia and industry that can produce cutting-edge technologies for the warfighter.

The power of science was in abundant display during the 1990-1991 Persian Gulf War. Americans tuned in nightly during Operation Desert Storm as Generals Norman Schwarzkopf and Colin Powell showed off the latest in U.S. military technology: Stealth bombers, cruise missiles, “smart” bombs with laser-guidance systems and infrared night-bombing equipment.

But behind the scenes, military researchers were concerned. Private-sector technology was advancing at an astonishing clip. Military labs had to find a way to bridge that gap.

The U.S. Army Research Laboratory (ARL) decided that if you can’t beat ‘em, join ‘em.

“The leadership of ARL realized that while the Army generally is credited with the first major use of the digital computer, the civilian world has moved ahead in both computers and telecommunications,” Dr. John W. Lyons, the first head of the ARL, wrote in the September – October 1995 issue of Army RD&A (the predecessor to Army AL&T). “We decided to combine our efforts with those of industry and academia, thereby enhancing our research for the benefit of Soldiers.”

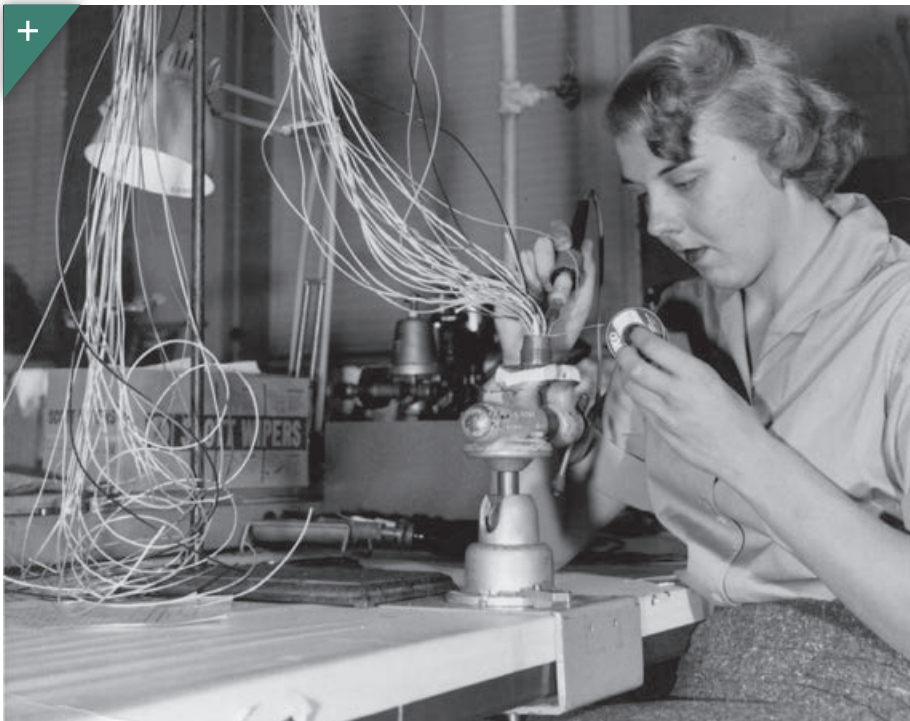
“When they formed ARL, one of the parts was to bring industry in closer, and also universities,” said Dr. Brad Forch, a senior research scientist for ballistics, in a telephone interview. Forch has been at Aberdeen Proving Ground (APG), Maryland, since 1985.

Funding concerns were also an issue. When ARL was formed in 1992, consolidating seven Army research laboratories primarily at APG and Adelphi, Maryland, the Cold



### LOOKING TO THE FUTURE

ARL's Electronics Program seeks to generate new fundamental knowledge of electromagnetic, photonic and acoustic devices, systems and phenomena to provide technological superiority to the Army's future force. The Open Campus fosters a focus on basic research looking far into the future—the mix of perspectives from inside and outside the Army can lead to breakthroughs. (Photos courtesy of ARL)



### NEW APPROACHES EXPAND ON LONG HISTORY

An electronics technician works in the Diamond Ordnance Fuze Laboratories (DOFL) Model Shop a half-century ago. DOFL, which made significant fuze contributions in areas such as printed circuits, flow and temperature measurement, reserve power supplies, air navigation systems and nuclear effects studies, evolved to become one of seven Army laboratories that merged to form ARL in 1992.

War was over. The fall of the Soviet empire had led to tighter U.S. defense budgets, and the Base Realignment and Closure Commission was in its second phase. There were calls to reduce defense spending even more. One Army research lab had already been targeted for closure.

“In today's climate, with government downsizing and constrained resources, requirements for the Army research program are growing,” Lyons wrote. “This paradoxical situation of having to do more with less actually offered new opportunities.”

Twenty years on, ARL's ties to industry, academia and small businesses are stronger than ever. With defense spending ever more austere, ARL's partnerships are vital to the research needed to serve the warfighter. An “open campus” lets researchers from industry, small businesses, universities, other government facilities and foreign nations get in on the front end of the basic research that can lead to breakthroughs for military and civilian uses. The lab uses cooperative research and development agreements (CRADAs) to form partnerships for basic research, which can extend from concept, such as when an idea is put on paper—say, the creation of a new polymer—to when someone suggests that the polymer could have protective properties against a chemical attack if applied to an M1A1 Abrams tank. Then, very limited controlled testing begins.

“There's not enough money. There are other countries that can do what we do, and they're advancing science and technology at an enormous pace,” said Forch. “DOD can't do it on its own. We need industry, we need universities, we need to work side by side with them. ... When you collaborate, it's not about having somebody come to one of your program





### THE FLOOR IS OPEN

Business and academic collaborators talk about Army priorities during a November 2015 open house at APG. ARL was designed explicitly to get industry and academia more involved in Army research that, during the Cold War, was compartmentalized and not particularly open to industry.

reviews and see what you did last year. The collaboration means you and I are going to work together because we have mutual interests in this science or technology. And if I don't do my part and you don't do your part, this whole thing is going to collapse; it won't work. It's interdependence."

During the Cold War, for both security and ethical reasons—not wanting to give one defense contractor an advantage over another—there were limits on cooperation with the private sector. "We worked with industry at arm's length," said Dr. Troy Alexander, ARL's associate for strategic planning, in an interview at ARL headquarters at the Adelphi Laboratory Center.

After 9/11, during the wars in Afghanistan and Iraq, ARL became less focused on basic research and got involved in solving immediate problems on the battlefield, such as improvised explosive devices. ARL had a major role in developing Mine Resistant Ambush Protected vehicles.

But as U.S. engagement in the wars winds down, ARL is turning its attention back to basic research, which has meant moving toward an open campus. "This is

something new for DOD," Alexander said.

The idea behind the open campus is that removing barriers would clear the way for cutting-edge research, especially in areas where the private sector has had a big head start. ARL seeks to leverage the substantial brainpower available in industry, academia and small business to build a "science and technology ecosystem" that will fuel breakthroughs in basic and applied research that can directly help the Soldier. Industry, universities, small businesses and other government laboratories benefit from access to ARL's researchers and unique technical facilities.

The engine powering this collaborative effort is the CRADA. The agreement provides no funding to industry or academia—each participant brings its own. The CRADA just sets the rules for the collaboration. "The unique thing about this is this is not a funding vehicle," said Alexander. "In the CRADA there's no exchange of funds. So everybody has skin in the game. And there's a mutual benefit from both sides, both the Army side and the industrial side, to work this."

CRADAs have existed since 1986. But Dr. Thomas Russell, who became ARL

director in March 2013, has pushed them as the key to the lab's partnerships with industry, small business and universities. The lab's relationship with industry "was slowly changing," said Forch, "but we really wanted to accelerate the change. ... There's been just an enormous amount of progress in the three years that [Russell has] been here."

The CRADAs allow Army and private-sector researchers to set the terms for who does what research, who gets intellectual property rights, who gets to develop what and for how long. For industry and academia, "there's mutual benefit," said Alexander. "I can help guide this as well as the Army can help guide this, and so we're working together to find the best technical solution for the problem."

And a breakthrough in the lab today could save the life of a Soldier tomorrow. "We always say we work for the 'Army after next,'" Alexander said, "not necessarily the Army fielded today."

For more information, go to the ARL website: <http://www.arl.army.mil/www/default.cfm>. For a historical tour of Army AL&T over the last 55 years, go to the Army AL&T archives at <http://asc.army.mil/web/magazine/alt-magazine-archive/>.



# Office of the Assistant Secretary of the Army (Acquisition, Logistics and Technology)

As of 05/31/16

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\* Deputy for Medical Systems. Receives acquisition oversight but reports to the Surgeon General



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“While we constantly strive to develop breakthrough technologies in our labs and research, development and engineering centers, we also encourage the development of innovative solutions from industry partners, including small business firms.”

**The Honorable Katrina McFarland**  
*Acting Assistant Secretary of the Army  
for Acquisition, Logistics & Technology  
and Army Acquisition Executive*

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