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REQUIREMENTS



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Q&A with MG Cedric T. Wins
on making requirements work

KILLING THE 'CREEP'
JLTV competitive prototyping
squashes requirements creep

PATHS TO LEADERSHIP
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JULY-SEPTEMBER 2015

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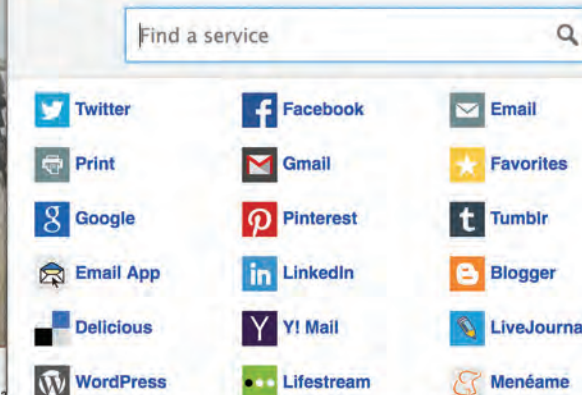
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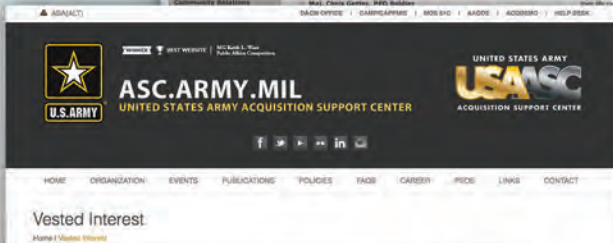
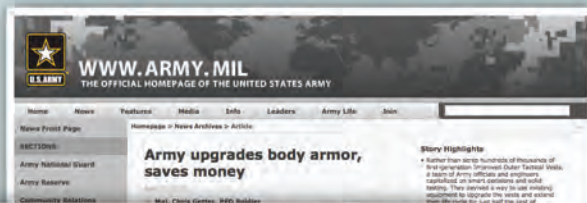
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From the Editor-in-Chief



@Email Nelson McCouch III
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I recently had the great fortune to attend the Harvard Senior Executive Fellows program. The goal of the course is not to teach you “what” to think, but to provide you with the skills of “how” to think, using a strategic approach and framework for problem-solving. One particular problem-solving simulation evokes the theme of this issue: *requirements*.

Our team was presented the problem of effectively communicating how to assemble a jumble of different shapes into a particular figure. We had a diagram of the finished product, made up of approximately 22 different shapes—everything from circles, to squares, to a rhombus (it took me a while to figure out what that even was). We had approximately 20 minutes to write down instructions, without diagrams, so that a production group could build what we envisioned. At this point, if you’re an astute reader, you might be thinking, “Hey, that sounds like Training and Doctrine Command (or TRADOC) defining future system requirements.” You would be right.

We painstakingly wrote detailed instructions on how best to combine the various shapes to achieve the desired end state, such as, “Take the circles and the short oblong piece and the large square, and put them together so the right side is flat.” It made perfect sense to us, given that we had the diagram of the finished product.

Enter the group required to actually produce the item, and feel free to substitute the Army Acquisition Workforce. The hardest part of the exercise was watching the production group try to follow the written instructions. What seemed crystal clear on our “requirements” side got badly mangled on the production side. After 20 minutes, the production group built a product using all the parts, but in a much different shape than intended.

Our team was one of several that did not deliver a final product. However, many of the teams successfully built the final product. The difference? Their requirements were not overly prescriptive but described the final shape desired, letting the production group hammer out the details. In almost every case of less instruction, the group delivered the desired product well ahead of the 20-minute goal.

The moral of the story: “Tell them what you want, not how to build it.”

This insight applies not only in the academic setting of Harvard University, but in the real world of Army acquisition as well. Case in point: In this issue, you can learn the importance of generating requirements from MG Cedric T. Wins, in a Q&A with the Army Capabilities Integration Center deputy director.

Find out what it takes to get them right from the Program Executive Office (PEO) for Enterprise Information Systems’ aptly named article “Getting Requirements Right.” It’s about transitioning lifesaving quick reaction capabilities to programs of record for permanent use by the Army, and the challenge of documenting requirements to support the transition. Creating clearly understandable requirements takes teamwork. See how the PEO for Command, Control and Communications – Tactical uses lessons learned to develop a unified approach that evolves radio requirements and technologies incrementally. Also, hear how industry tackles tricky requirements problems from Dr. Ryan Dirks, head of research and development for Arkema America. (You may never have heard of them, but you probably use many of their products, which include fuel lines, refrigerants and coatings such as paints.)

In addition to these articles, there are lots more insights in this issue on how to implement and manage requirements using knowledge management, effective communication and continuous process improvement techniques.

Finally, you should know that Army AL&T magazine is a recognized leader in delivering information you need in a state-of-the-art manner. In March, your magazine won first place for digital publications in the Army’s 2014 MG Keith L. Ware Public Affairs Competition, which recognizes Soldiers and DA civilian employees and organizations for excellence in effective communications. With that in mind, please check out our online publication at <http://usaasc.armyalt.com>. See all the photos and other extras available, and share a link with a friend or co-worker. Questions or comments? Write to me at ArmyALT@gmail.com.

Nelson McCouch III
Editor-in-Chief



CAPABILITIES FOR LIVE FIRE

Soldiers from 1st Battalion, 187th Infantry Regiment, 3rd Brigade Combat Team, 101st Airborne Division (Air Assault) (3-101 ABN) rush up a training range hill in Laghman Province, Afghanistan, during a combined arms live fire exercise in May. Technically sound, affordable and achievable requirements contribute significantly to acquisition programs that meet cost, schedule and performance objectives to succeed ultimately in providing the Soldier with a decisive advantage. (Photo by CPT Charlie Emmons, 3-101 ABN Public Affairs)





FROM THE AAE

FROM THE ARMY
ACQUISITION EXECUTIVE
THE HONORABLE HEIDI SHYU



FROM THE AAE

ACHIEVABLE REQUIREMENTS

Building a solid base for program success

Requirements lay the foundation for the acquisition process as a whole and typically play a significant role in determining the success or failure of a program. Having a set of technically sound, affordable and achievable requirements is widely regarded as a significant factor contributing to acquisition programs that meet cost, schedule and performance objectives.

The lessons learned from the Army's prior failures in major programs such as Future Combat Systems and Comanche attest to the well-known truism that unrealistic requirements, overly optimistic schedules or budget instability can lead to failed programs. The Army has applied these lessons learned to craft affordable, realistic requirements.

One recent example is the Armored Multi-Purpose Vehicle (AMPV) program. The process of determining requirements for AMPV ran from August 2010 to June 2013, with the engagement of senior Army leadership in advance. This process concentrated on the capabilities needed to ensure AMPV mission success within the armored brigade combat team, while refining the capabilities needed to help maintain mobility and protection. It also included a review of size, weight, power and cost considerations.





BALANCING REQUIREMENTS

With senior Army leadership involved from the start, the requirements process for the AMPV program concentrated on the capabilities needed to ensure its mission success within the armored brigade combat team while specifically refining capabilities that support mobility and protection. (Photo courtesy of Program Executive Office for Ground Combat Systems)

AMPV requirements were reviewed, strengthened and validated by the Army, the Office of the Secretary of Defense and the Joint Staff. The Army also solicited industry feedback through industry days and requests for information, which led to cost-informed trade-offs to relax or reduce some requirements.

Another recent success is the Joint Light Tactical Vehicle (JLTV) program, which won the David Packard Excellence in Acquisition Award in 2013 for cost-saving measures identified by working collaboratively with the requirements community to achieve affordability. During the JLTV's technology development phase, the Army conducted a cost-informed trade assessment that examined design options, requirements and affordability. This program is an example of the success the Army can achieve by defining realistic requirements in partnership with industry.



KNOWLEDGE FLOW

The U.S. Army Aviation and Missile Research, Development and Engineering Center (AMRDEC) industry day in December 2014 provided a forum where stakeholders and other interested parties could exchange information and learn about best practices. The goal was to boost industry productivity and provide affordable military capabilities to the warfighter. (Photo by Bill Crawford, AMRDEC Public Affairs)

INSTILLING COLLABORATION

The Army has taken the initiative to institutionalize these value-added processes to ensure more successful acquisition outcomes. Drawing guidance from Better Buying Power 2.0 initiatives, ASA(ALT) signed the implementation memorandum in August 2014 requiring "knowledge point" reviews at key junctures in the development of all major acquisition programs. This in-depth process establishes a forum for critical review of a system's proposed specifications for program technical risks, cost and viability. These reviews allow Army leadership to judge the realism of requirements as a function of cost, schedule and technical risks before Milestone B. Identifying performance trade-offs in this way ensures that the program remains affordable and achievable.



GETTING THE GEAR THEY NEED


An Apache crew member dons the Joint Service Aircrew Mask during an operations test at Fort Hood, TX. The Army has institutionalized a number of value-added processes, including knowledge point reviews and CSBs, to ensure more successful, affordable acquisition outcomes as it seeks to provide warfighters with the capabilities they need to prevail. (U.S. Army photo)

The Army also conducts statutory configuration steering boards (CSBs) for all major defense acquisition programs and major automated information system programs on an annual basis. CSBs bring together members of the acquisition, requirements, resourcing, testing and logistics communities to review and approve requirements and significant technical configuration changes after Milestone B that could impact program cost and schedule.

CONCLUSION

These collaborative efforts between the combat developers who generate system requirements and the members of the acquisition community who are responsible for translating these

requirements and producing dominant warfighting capabilities are essential to program success. While our combined efforts represent a positive step over the last few years, we must continue to improve.

Our goal is to better leverage our systems engineering talent during requirements generation to produce trade space between requirement, total life-cycle cost, schedule and technical risks. In addition, we must continue to issue requests for information and conduct industry days to obtain what is possible based on feasibility. In a fiscally constrained environment, our processes must continue to ask what capabilities we desire, what is within the art of the possible and what is affordable. 



ACQUISITION

SPOTLIGHT:

MR. JAMES A. DAILY



A front-row seat at acquisition history

MR. JAMES A. DAILY

COMMAND/ORGANIZATION:

Joint Program Office for Joint Light Tactical Vehicles, Program Executive Office for Combat Support and Combat Service Support

TITLE:

Procurement analyst

ACQUISITION CAREER FIELD:

Contracting

YEARS OF SERVICE IN WORKFORCE: 10**EDUCATION:**

B.S., human resource development, Oakland University

DAWIA CERTIFICATIONS:

Level III in contracting

AWARDS:

Commander's Award for Civilian Service; Achievement Medal for Civilian Service

Looking for a position that offered stability along with the chance to use his contracting skills, James Daily began his career in acquisition roughly 10 years ago. In that time, he's had a front-row seat as the Joint Light Tactical Vehicle (JLTV) Program moves through its life cycle and has earned praise from the program office for his support of that progress.

The JLTV Program, a joint effort involving the Army and the U.S. Marine Corps, is intended to restore light tactical mobility to the Army's fleet and fill the gap between legacy High Mobility Multipurpose Wheeled Vehicles and the larger, less mobile Mine Resistant Ambush Protected vehicle fleet. The Army plans to buy approximately 50,000 JLTVs, and the Marine Corps 5,500. The program comes under the Joint Program Office for Joint Light Tactical Vehicles in the Program Executive Office for Combat Support and Combat Service Support (PEO CS&CSS).

Daily played an instrumental role in developing the JLTV request for proposals for low-rate initial production (LRIP) and full-rate production (FRP), slated for award in the fourth quarter of FY15. He led an integrated product team (IPT) for the LRIP/FRP scope of work (SOW), which involved investigating possible approaches to SOW development with functional leads—including business management, logistics, test and quality—and documenting the agreed-upon approach, structure and schedule. Creating, leading and managing the IPT involved close collaboration with the TACOM Life Cycle Management Command's Acquisition Center and its legal staff to fully address the complexities of writing an SOW for an eight-year period. The SOW covers vehicle production, system technical support, interim contractor support and total package fielding requirements.

"Getting everyone on the same page—including the functional areas within our office as well as the stakeholders outside of it—can be a challenge, as is making sure that requirements don't conflict or overlap," Daily said. "Also, since this is a joint project, we need to make sure we're working well with our Marine counterparts in

Quantico [Marine Corps Base Quantico, VA]. We've been able to achieve all that through communication and having our program managers use their resources and connections to keep all of us moving in the same direction."

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

As a procurement analyst for the Joint Program Office Joint Light Tactical Vehicles, I gather program requirements, draft and complete required acquisition documents and act as a liaison between the program office and our contracting center, which executes the procurement. By providing contracting expertise within the program office, I contribute to the successful acquisition of supplies and services that our warfighters need.

How did you become part of the AL&T Workforce, and why?

I was hired in an intern contract specialist at the TACOM Contracting Center in Warren, MI, about 10 years ago. I was working in the private sector for a company that was somewhat unstable—and eventually went out of business—and I was attracted to this position because it offered similar work to what I was doing in the private sector and was much more stable.

What do you see as the most important points in your career with the Army AL&T Workforce, and why? Is there a program or opportunity you wish you had pursued but didn't?

The training I received as an intern contract specialist provided a strong foundational knowledge of the acquisition process, procurement statutes and regulations, and contracting methods, which still serves me today. I can't think of any



EVERY DETAIL COUNTS

Daily was instrumental in developing the JLTV request for proposals for LRIP and FRP, slated for award in the fourth quarter of FY15. The work involved investigating possible approaches to developing the SOW in collaboration with functional leads, and documenting the agreed-upon approach, structure and schedule. (Photo by Rae A. Higgins, PEO CS&CSS Strategic Communications)

opportunities that I wish I had pursued. Overall, I feel pretty lucky: I've had the chance to work in a great program and to see it over the course of the life cycle, from the technology development phase through engineering and manufacturing development and now at Milestone C.

What's the greatest satisfaction you have in being a part of the AL&T Workforce?

Having the opportunity to be a contributing member of the JLTV Program as it progresses through the life cycle milestones.

Acquisition is a very broad term encompassing a lot of different job specialties, with many career tools available to them. What advice would you give to someone who wants to get where you are today?

Establish a good foundation. I still use and build upon the knowledge and skills obtained as a contract

specialist—understanding and using FARS [the Federal Acquisition Regulations System] and DFARS [Defense Federal Acquisition Regulation Supplement], the steps of the buying process and the whole process of putting a contract together, from obtaining requirements to getting it out on the street. Working with and supporting different program offices as a contract specialist provided for a natural progression to a procurement analyst position within a program office.

What's something that most people don't know about your job? What surprises outsiders most when you tell them about your job?

People outside the government find it hard to believe I am actually employed by the Army and not a defense contractor. They don't seem to realize the Army has a civilian workforce that supports the warfighter.

—MS. SUSAN L. FOLLETT

REQUIREMENTS OVERREACH

Well-considered and -developed requirements can lead to top-notch systems and programs. Requirements creep—taking a simple system and making it overly complex—can ultimately lead to systems that Soldiers simply cannot use. (Image by Rhett Stansbury, U.S. Army Acquisition Support Center)



From CONCEPT to DELIVERY

A Q&A with ARCIC's MG Cedric T. Wins

Acquisition is all about requirements, and it's the U.S. Army Training and Doctrine Command (TRADOC) that is responsible for them—peering into the future through the lens of present-day circumstances to decide in what direction, and with which capabilities, the Army needs to go in order to continue being the best-equipped and best-trained force the world has ever known. But if requirements are the bricks of acquisition, then it's the Army Capabilities Integration Center (ARCIC), part of TRADOC, that provides the mortar by developing concepts and capabilities, evaluating proposed Army modernization solutions, and integrating these capabilities across the areas of doctrine, organization, training, materiel, leadership and education, personnel and facilities.

That's why Army AL&T magazine reached out to MG Cedric T. Wins, director of the ARCIC Requirements Integration Directorate. ARCIC has the job of figuring out what the Army needs to defeat future adversaries and how it needs to get from concept to capability to make that happen.

"Everything starts with requirements," said Wins, who assumed his current position in May 2013. Before coming to ARCIC, he served as the deputy commander for police and the joint program executive officer for the Afghan Public Protection Force Advisory Group, NATO Training Mission – Afghanistan and Operation Enduring Freedom.

During his 30 years of service, Wins has held command and staff assignments in field artillery units in the 7th Infantry Division, the 2nd Infantry Division and the 4th Infantry Division. Additionally, he has served in assignments with



the HQDA and joint staffs. He holds an M.S. in management with a concentration in quantitative analysis from the Florida Institute of Technology, an M.S. in national security and strategic studies from the National War College, and a B.A. in economics from the Virginia Military Institute. He is a graduate of the Field Artillery Officer Basic and Advanced courses, the U.S. Army Command and General Staff College and the Operations Research Systems Analysis Military Applications Course.

We spoke with Wins during a June 5 interview that included the themes of discipline, collaboration and “the art of the possible.” Wins outlined the best way for the acquisition community to understand and execute the requirements that ARCIC articulates, and the mechanisms that ARCIC uses to support the acquisition community in interpreting them. One component of that is rehearsal of concept (ROC) drills—bringing together ARCIC, the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)) and the G-8 and G-3 staffs at HQDA for a complete review of failed and successful programs to determine what mistakes were made,

where they occurred and the role that policies and procedures played.

Wins also discussed the differences in developing requirements for materiel versus those for services and training, and the importance of involving the acquisition workforce in the requirements process, “to ensure that we have some of [the acquisition community’s] best and brightest come and spend a little time on the operational side.” Thus each side can learn from the other, and both can better understand how a decision made early in the requirements process affects the acquisition community later.

Wins noted the importance of ensuring continued modernization despite declining funds. He emphasized the need to be efficient and disciplined, saying that the Army has to figure out what it wants and how to deliver it, “because we can’t get everything.”

Army AL&T: Thanks for talking with us. A requirements-themed issue of Army AL&T magazine without ARCIC would be all uniform and no Soldier.

Wins: I appreciate the opportunity just to have a dialogue and talk to you all, and do what I can to answer some of your questions, to try to enlighten not only myself but perhaps some readers down the road. You know, having done this job over the last two years, it really has been an eye-opening and learning experience for me, particularly coming from the side of the Army that I was on previously, which has the responsibility to resource our requirements. So with that, I appreciate the opportunity. Hopefully, I can shed some light on some things based on what I’ve learned here over the last couple of years. And hopefully I can give you some answers that will be suitable.

Army AL&T: How can we, as the acquisition community, do the best job to understand and execute the requirements that the ARCIC articulates?

Wins: On all sides of the coin, we understand that everything starts with the requirement. That, then, leads to a discussion about how we resource it and then, of course, with the acquisition community doing the work that they need to deliver a material solution. It’s about delivery of systems—often material delivery of a system. And in that kind of triad, there are other folks integral in our ability to deliver capability as well—the test community, for example.

That type of work, building a capability from a requirement, probably only gets done best in a collaborative fashion. And so on our side, we’ve been trying to do some things to try to improve the requirement side of the process, and we have to work to continue to discipline ourselves on our requirements. We develop our requirements coming from learned experience from the operational community; also, from having dialogue and discussion with the acquisition community—the

In this day and age, when we know that the level of resourcing we received over the last 12 years — particularly the resourcing we received for combat operations — is being reduced so significantly, we’ve got to set ourselves up to ensure that continued modernization occurs for the force, and we’ve got to do it smartly and we’ve got to be efficient with it.

S&T [science and technology] side of the acquisition community to learn what's possible—and then also with industry to gain a better understanding of what they're doing that might provide solutions to our capability gaps.

But we still have to make sure we discipline ourselves in terms of how we write our requirements, discipline ourselves in terms of how we build our requirements. One key feature, as far as I'm concerned, is that as we build our requirements, we need to understand how much is enough to get us the capability we want. And [there may be] some areas where we say, "Hey, we'd like to stretch ourselves in terms of the capabilities we want to get. They [industry] are making some things that allow us to operate more effectively or that give us some additional key features in terms of lethality or mobility or some other type of '-ility.'" And then we have to be able to understand that those additional or enhancing things become tradable; otherwise our requirements will exceed our ability to pay for them.

So it's collaboration, it's discipline in the requirements, and then it's making sure that we understand what's most important, the must-have things to get a capability. And then we can say, "Hey, you know, if we get this it's great, it will certainly give us added capability or enhance the capability." But it's also taking into account the fact of what can be designed, what can be developed, what can be done over time and what it's going to cost you: That allows us to begin to think about scaling back to get to a more affordable solution.

So that's in general terms how we go about getting that work done through collaboration. There are a couple of things that we have done in recent months, in this year, FY15, to just try to get the



COLLABORATION BLUEPRINT

SSG Joshua Blake from the Army's 3rd Armored Cavalry Regiment briefs leaders of the U.S. Army Tank Automotive Research Development and Engineering Center (TARDEC) on the final day of the Soldier Innovation Workshop, held May 18-20 at the Detroit Arsenal in Warren, MI. Soldiers collaborated with transportation design students from Detroit's College for Creative Studies to develop ideas and designs that will inform the concept and requirements for future mobile protected firepower capabilities. Requirements don't just specify how a system should be built and used; they can also be a blueprint for how government and other stakeholders will work together. (Photo by Jerome J. Aliotta, TARDEC)

community as a whole to recognize. And one of the things we're undergoing right now is a series of ROC drills—rehearsal of concept drills—going from capability development to materiel acquisition to delivery of systems.

And this has become a joint effort [involving] not only ARCIC but also the ASA(ALT) community with heavy participation from a lot of stakeholders, including the HQDA G-8 and G-3 folks. The ROC drill is intended to just walk us through the process from the requirements document to an approval, to the resourcing, to all the work that has to go on to define the

real technical specification of what that requirement is, to make sure that we don't overreach on those as well, and then get us to the materiel delivery.

We've already done one ROC drill on an existing capability. We wanted to really plow into something that we know that we're going after, and we'd like to try to see if we can get to the right solution in an innovative way and see if we can get it more rapidly than the normal process typically allows.

But then we'd like to take ourselves through another series of ROC drills to

A NEW BATTLEFIELD

Soldiers from the 40th Special Troops Battalion prepare the Joint Network Node in preparation for a warfighter exercise. ARCIC has the job of figuring out how the Army can get from concept to capability to acquire what it needs to defeat future adversaries. (U.S. Army photo by MAJ Daniel Markert)

perhaps look at a failed experience to see what were the lessons we were able to pick up and learn—one of our earlier efforts that didn't yield the results that we wanted, that maybe got bogged down on the requirement side by writing them too rich, where, if we got what we described, it would exceed what we could afford. Maybe we got bogged down on the testing side because we couldn't develop a system that could pass the test—because we over-prescribed the requirements, making it difficult to test—or maybe we got bogged down on the side of acquisition delivery because what we designed was not achievable because of technology, our inability to integrate the capabilities, etc.

And then lastly, take one program we know we had success with and look at it, and then bring out the best set of lessons learned and see how much of what we learned would require us to adjust our policies, our procedures on both sides, and within our AR 71-9 ["Warfighting Capabilities Determination"] or in making recommendations on the JCIDS [Joint Capabilities Integration and Development System] process or in the DOD 5000 ["Operation of the Defense Acquisition System"].

Army AL&T: In terms of the biggest change you've implemented in ARCIC to ensure that requirements are taken into account, has this ROC drill you're describing been around before, or is this a new process that you've put in place?

Wins: We've done ROC drills before in ARCIC, but this is the first time since I've been here that we've done one focused on our requirements. This initiative is fairly new. But one of the things that we have done is, as we've gone through requirements, depending on where we're going—where we are in a milestone decision—we had opportunities to bring together that same team and discuss making changes to the requirements: What changes need to be made? What's in the art of the possible? What is causing us to have problems where we are coming up with unaffordable solutions?

And when we brought that team together and started having discussions, it was with the idea in mind of modifying the requirement. In doing so, we paid attention to the impact those changes would have on the overall timeline of delivery, be it for the requirements, the technical specifications necessary for the developmental systems or the system in production. We consider these changes as to how they would affect the resourcing and whether we're pricing ourselves out of business if we're not willing to be flexible in our requirements. We also considered how well we were applying the right measures in our requirements to get after something that could be tested and evaluated correctly.

Army AL&T: In an article that Breaking Defense did about the Army changing how it does requirements, LTG H.R. McMaster,

ARCIC director, said that the Army just did an initial capabilities document for mobile protective firepower. Some of the things you're describing are milestones. Are you talking theoretically about a new system, or are you talking about looking at current systems and then picking and choosing and trying to apply those in the requirements for new capabilities—in other words, a better path to success?

Wins: It's not just new requirements. It can in some cases be a requirement we're making a modification to. The idea of the first ROC drill, as it turns out, focused on a new requirement. So we did one on a new combat platform we're going after, which we believe is probably going to require development of an initial capabilities document. And so that was one we wanted to look at first. But we also want to go back and look at an example of where we were not successful or [had] a bad experience, and [also] one where we were very successful in delivering a capability.

I think we're going to pick and choose ones we actually were successful at because we went from the requirement document all the way to the acquisition delivery. But it may turn out the requirements document for that successful developmental system didn't start with an initial capabilities document. It's kind of a little technical nuance, but the bottom line is, we'll look at all of it in order to determine what our best practices were, but also where we might make changes to our internal or external processes.

Army AL&T: When ARCIC articulates a requirement, what's the mechanism by which you ensure that the acquisition community is interpreting and executing it correctly? You put it out there, but what are the checks and balances as far as ARCIC is concerned?

Wins: For the requirements that get developed, first of all, it's where they start. They start down in the centers of excellence within the CDID, the Capability Development Integration Directorate. And they typically have TCMs, TRADOC capability managers. Those TCMs should be very much in tune with, or very much committed to, collaborating and working with program managers [PMs] and product managers to properly understand and shape the requirements.

The idea is that as they're writing the requirements and forming parameters and the attributes from the very beginning, they are having a constant dialogue about what's in the art of the possible and what would amount to overreaching. They ought to be having a dialogue on what you can measure effectively or how it translates from a KPP, or key performance parameter, or KSA, a key system attribute, into the technical specifications that a PM will have to write, so that when he puts out the performance work statement to industry, they can say, "Oh, yeah, we understand exactly what it is that you're looking for."

So it starts at that basic level. The requirement gets written, but it still must be validated, and that is where ARICIC and my directorate become the first gate. And for that validation, my organization is that first line. But we don't do that work in isolation either. We make sure that as a part of the collaboration we lead, we're talking to HQDA from a resourcing perspective, we're talking to HQDA in terms of overall Army priorities for modernization. And we're talking to the ASA(ALT) people at the secretariat level to make sure that there is a common understanding of what we're trying to get, when we're trying to get it, and what the most essential and most important features are that we need in a system.

Army AL&T: As you describe it, it sounds like the capability portfolio review.

Wins: The capability portfolio reviews are a little different. What I'm really talking about is how we do things like participate in ASARC, the Army Systems Acquisition Review Council, configuration steering boards (CSBs) and requirements-to-resources forum (R2R) with the G-8, for example, where we discuss the status of requirements and how we ensure that the most important requirement documents can make it into the headquarters in time for a POM [program objective memorandum] deliberation. Because everything must run on that track, where at some point you've got to be able to match money to the requirement you need to deliver. So, for getting a validated requirement to resources, there is a General Officer Steering Committee to move Army requirements along.

Another vehicle that we use is what we call a JCIDS reconciliation, which is done in collaboration with the G3/5/7. It's a similar approach to R2R, but it's intended to make sure the Army requirements documents are also getting pushed through to the joint level when it's needed.

But we still have to make sure we discipline ourselves in terms of how we write our requirements, discipline ourselves in terms of how we build our requirements.

Army AL&T: While a lot of acquisition focuses on materiel—the tank or the helicopter, for example—there’s also a lot of service and training embedded in the requirements to get the Soldiers up to speed or to create the test ranges and all the associated things. Do you take the same approach, or a different approach, to make sure that all those requirements are also attended to? Is there a new way of thinking about how we incorporate all those aspects into the process? It’s not just the weapon system in the end; it’s all these ancillary things that make it work. From a requirements perspective, do you take the same approach that you do with a weapon?

Wins: From a standpoint of determining how you build capability, the requirement for materiel, acquisition should be the last thing you look for, not the first. We have plenty of capability within the Army that we are able to provide to joint force commanders. But we build new capability when our existing set becomes obsolete, or when we see an opportunity to leverage advances in technology to expand our overmatch, or if that capability is insufficient to meet a need in

a certain operational environment or versus a certain threat that has gained an advantage over us, thus limiting our ability to gain and maintain a decisive advantage.

That is what leads us to look across doctrine, organization, training, materiel, leadership and education, personnel, facilities—DOTMLPF. But it is first looked at with an eye toward a small m. We first look within our existing capabilities to find out if there is a non-material solution or one that can be solved with a modest improvement to our existing equipment. It’s sometimes possible there’s an organizational solution to solving a capability gap and it may not require the Army to go after a new material solution.

But having gone through that evaluation, if we determine that a material solution is required, then we begin the process of identifying the requirement and what other areas across DOTMLPF-P may need to be adjusted. And that’s when we have to work with the community across the board.

Often a new material solution requires us to look at different ways to train once that piece of equipment is fielded. If it’s a weapon system, we might need to modify our ranges, we may need to design additional ways to train and qualify crews on system-training aids and devices, or we may need to increase the size of our motor pools or bays to store, repair or perform services on that equipment.

So within TRADOC, we have to work with folks out in [the U.S. Army Combined Arms Center], we work with the centers of excellence, because they have the experts who can do doctrine writing. We have to work with the installation folks to understand how changes in requirements will need to consider those changes in our facilities. Organizationally, we work within my organization and we work with HQDA when changes to our requirements drive a need for changes in structure and our organizations, and so on and so forth.

Army AL&T: Lastly, tell us what you think the Army Acquisition Workforce should know about requirements, their stake in how to do that right.

SUM OF MANY REQUIREMENTS

A training specialist, second from right, deployed from U.S. Army TACOM Life Cycle Management Command, observes Soldiers from 3rd Battalion, 187th Infantry Regiment as they complete operator training on the Common Remotely Operated Weapon Station (CROWS) at Bagram Airfield, Afghanistan, in January. CROWS can be mounted on more than 20 platforms and accommodate four different weapons, which means this system of systems is the result of a complex mélange of requirements for hardware, software, vehicles and more. (Photo by Summer Barkley, 401st Army Field Support Brigade)





NEW, MONEY-SAVING PROCESS

Joseph Ward injects asphalt into a recovered projectile to cover the surface of the inert cement fill before loading the Insensitive Munition Explosive-101, which replaces TNT and Composition B and provides a more stable fill. Sometimes requirements focus on how to use cast-off parts in new ways. (Photo by Kevin Jackson, U.S. Army Materiel Command)

Wins: I have a number of service uniformed personnel who work in my organization who are part of the Army Acquisition Corps. And it doesn't hurt to ensure that we have some of [the acquisition community's] best and brightest come and spend a little time on the operational side, to make sure that we are learning from them and they are learning from us—what it means to have a requirement written in a certain way, what it means when we start talking about, “Hey, we want to go with a software solution,” or, “We think we need to go with an off-the-shelf solution.” We can work together to understand the actual impact our efforts have on you all [the acquisition community] once the requirement is approved, once the resources have been found and once you all have assigned it to a PM or product manager. I think that is pretty valuable.

I think that we need to continue to ensure that the education afforded to our acquisition officers and civilian corps, as well as our capability developers, remains current and informs both sides. We need to make sure there are sufficient blocks of instruction that cover both so that people,

at least in a classroom settings, are being well educated so that when they get in the field, they can help us build what's necessary for our force across the range of operations we are required to perform.

Army AL&T: Well, we'll pass on your idea about a talent exchange to LTG Michael E. Williamson [Army director, acquisition career management]. But you're right. If you don't know what the other guy is doing, it's hard to understand why they say what they do.

Wins: And I'm really talking about something that LTG Williamson and his folks have already been very good partners in. We recently had a very senior colonel with a great deal of acquisition experience working down in TRADOC, very much embedded in the work we're doing as part of the Force 2025 effort. We had the opportunity to sit and discuss with him how this effort gets shaped appropriately, what we need to understand about when we can expect the delivery of capability, how you approach it best: Do you go after the whole thing, or do you kind of spiral it in or progressively build on the capability


in order to not create significant cost problems for yourself? He was very valuable, and so the hope is that we'll continue to do that. There's a lot of good collaboration that's going on at all levels.

Army AL&T: Sir, we greatly appreciate your time. Is there anything else you want to add?

Wins: In this day and age, when we know that the level of resourcing we received over the last 12 years—particularly the resourcing we received for combat operations—is being reduced so significantly, we've got to set ourselves up to ensure that continued modernization occurs for the force, and we've got to do it smartly and we've got to be efficient with it. We've got to be disciplined with it, and we've got to make sure that we've got the right type of leadership oversight to make sure that, from start to finish we deliver on what it is that we're saying are the most essential capabilities for the Army. You're not going to be able to get everything, and at the end of the day, we're really still interested in providing the best capability for the warfighter.



(SOURCE: bluebay2014/Dollar Photo Club)



IN SYNC, SECURE AND AWARE



Cyberspace is the new frontier, and on this virtual battlefield, where the lines of offense and defense are blurred if not obliterated, it's critical for the Army not only to respond to operational needs but also get the requirements for near-term and future capabilities right, because as integration and interoperability increase, so do potential vulnerabilities.

by COL Timothy D. Presby and Dr. Portia I. Crowe

Cyberspace, the newest DOD operational domain, grows more complex and contested by the day. But unlike the traditional domains of land, sea, air and space, cyberspace blurs the line. President Barack Obama has compared the lack of boundaries found in cyberspace to a game of basketball, where—unlike in football or baseball—there is no clear line between offense and defense. Instead, the roles switch constantly.

Such is the realm of cyberspace. And as Soldiers learn how to do battle within this new domain, the cyber frontier is also challenging the Army acquisition and requirements communities to successfully equip and train our cyber forces.

The need to ensure the confidentiality, integrity and availability of information is not new, and today's military systems are protected through patch management, authentication, encryption, host-based security processes and more. Because of the piecemeal approach to acquiring weapon systems, the Army traditionally treated cybersecurity as a support effort or service for an existing capability. But as cyber now takes on a new role—viewed as a warfighting capability for use in the digital battlefield—the Army is developing the integrated requirements to deliver a new set of solutions for today's security environment.



BUILDING BRIDGES

Defense Secretary Ashton B. Carter addresses the U.S. Cyber Command workforce at Fort Meade, MD, March 13. The cyber frontier is challenging the Army acquisition and requirements communities as they work to equip and train cyber forces for this complex threat. (DOD photo by PO2 Sean Hurt)

Recently, the director of national intelligence named the cyber threat as the number one strategic threat to the United States, placing it above terrorism for the first time since 9/11. April saw the publication of the DOD Cyber Strategy, which provides five prioritized strategic goals and objectives for DOD’s cyber activities and mission to achieve over the next five years.

In this urgent but fiscally constrained environment, it is critical to properly frame the Army’s cyber requirements and capabilities, as well as to ensure that they are flexible enough to support the inherent challenges of this domain.

TEAMING UP FOR THE CYBER REALM

Creating requirements focused specifically on cyber reinforces the need for information security and resilience throughout the program life cycle. To do this, the Army is using the Common Operating Environment (COE) as

a vehicle for increased security in newer systems, while also establishing security mechanisms for legacy systems. This strategy necessitates a holistic approach to acquisition and requirements that can adapt to address changing, emerging and unknown threats.

To prepare well for these threats, while also protecting and defending DOD’s information network and data, the Army materiel development and cyber operational communities are building cyber requirements to meet today’s needs. This team includes the U.S. Army Cyber Command (ARCYBER), the U.S. Army Training and Doctrine Command (TRADOC) Cyber Center of Excellence, the acquisition community and a variety of partners from industry and academia. From the acquisition side, the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT)) System of Systems Engineering and Integration Directorate’s Cyber Acquisition Task Force is responsible for

prioritizing cyber gaps and distributing requirements across program executive offices (PEOs) for execution.

Working with the ASA(ALT) Cyber Task Force and the requirements community are three PEOs with key roles in supporting these future technologies: PEO Command, Control and Communications – Tactical (C3T) leads in defense of the tactical network; PEO Enterprise Information Systems (EIS) leads in defense of the enterprise network; and PEO Intelligence, Electronic Warfare and Sensors (IEW&S) leads in offensive cyber efforts. This collaboration—along with those formed with other organizations that support cyberspace operations, such as the intelligence community, international alliances and joint and coalition forces—is key to employing a more defensible network architecture in the joint information environment.

President Barack Obama has compared the lack of boundaries found in cyberspace to a game of basketball, where — unlike in football or baseball — there is no clear line between offense and defense. Instead, the roles switch constantly.

The DOD Cyber Strategy: Strategic Goals

- Build and maintain ready forces and capabilities to conduct cyberspace operations.
- Defend the DOD information network, secure DOD data and mitigate risks to DOD missions.
- Be prepared to defend the U.S. homeland and U.S. vital interests from disruptive or destructive cyberattacks of significant consequence.
- Build and maintain viable cyber options and plan to use those options to control conflict escalation and to shape the conflict environment at all stages.
- Build and maintain robust international alliances and partnerships to deter shared threats and increase international security and stability.

FIVE STRATEGIC GOALS

To mitigate risks and defend U.S. interests in the current and future security environment, the DOD Cyber Strategy outlines five strategic goals and specific objectives for its activities and missions. (SOURCE: PEO C3T)

DIVIDE AND CONQUER

From weapon systems to communications capabilities, the Army must lock down its systems even more securely than today. The acquisition community has been responding directly to its customer, the Soldier, by addressing ARCYBER operational needs statements as they come in—even as we are establishing the resources and processes that will govern the long-term acquisition of cyber defense and warfare capabilities.

To aid in improved weapon systems cybersecurity, capabilities for the Army's newly constituted cyber mission forces and resilience for networks, the acquisition and requirements communities are working together to create new cyber requirements. These include capability development documents (CDDs) and

initial capabilities documents (ICDs), in various stages of development, that focus on defensive cyberspace operations, cyber situational awareness and offensive cyberspace operations. Leveraging multiple cyber requirements documents, instead of focusing on a single document, is by design and meant to instill a new level of adaptability as needs change and new threats emerge.

The mechanism that allows this multi-pronged approach, whereby several requirements documents work together holistically, is known as the Information Technology (IT) Box. Introduced by the DOD in 2014, the IT Box model allows approval for an overarching requirement—cyber, for example—then includes individual information system requirements documents for defensive

cyber operations, cyber situational awareness and offensive cyber operations that would only need approval at the service level instead of the joint level. The intent of the IT Box approach is to provide agility and flexibility while ensuring better-integrated cyber solutions than we have seen in the past.

In addition to the overarching requirements documents for cyber capabilities, the Office of the Secretary of Defense is imposing new cyber requirements at the individual system level, creating a cyber survivability key performance parameter to help programs increase cybersecurity in their baselines.

In pulling together the requirements documents, TRADOC and ASA(ALT) are also, for the first time, including

capabilities that reach across the total Army network, including both enterprise and tactical systems. Previously, the Army often approached the network as two distinct entities. Now, because of improved integration and the nature of cyber threats, the Army is looking at it more holistically. Data is data—how it flows through the network is the same, and its path must be protected.

Digital systems are fielded more broadly and to lower echelons than ever. Aware of this challenge, the Army continues to advance the modernization and integration of mission command capabilities to allow greater visibility in detecting and defending against cyber threats. The COE, which enables a common interface and architecture for a “plug and play” experience across different systems and operational environments, will also improve security through a common, cyber-hardened data foundation.

A CYBER COMMON OPERATING PICTURE

The cyber-related requirements documents in production address mission command functionality in cyberspace, with the overall goal of producing a clear common operating picture of the cyberspace terrain. This includes understanding the risks, their operational impact and options for mitigation, as well as how to use cyber as a warfighting function in unified land operations.

Defensive cyber operations-related CDDs are intended to build on traditional approaches to defending networks and systems by providing real-time capabilities to discover, detect, analyze and mitigate advanced cyber threats and vulnerabilities. These capabilities will enable defenders to protect key terrain in cyberspace, hunt for and detect adversaries that have gained or are attempting to gain

Creating requirements focused specifically on cyber reinforces the need for information security and resilience throughout the program life cycle.

access, and engage or outmaneuver those adversaries for the purpose of eradicating them and achieving mission assurance. Cyber Soldiers will be equipped with “defense in-depth” that integrates people, technology and operations across friendly, neutral and adversarial cyberspace—while having clear situational awareness that includes detecting and analyzing current threats, mitigating potential threats and outmaneuvering adversaries. From the delivery of these capabilities, commanders will realize freedom of action to operate in and through the cyberspace domain.

Closely tied to this effort is the cyber situational awareness CDD, which fuses existing sensor data and mission command data to show how they affect operations. This CDD seeks to move a commander’s situational awareness beyond an indication that an individual system—such as a network router—is not working, and instead will show what that downed or attacked router means to overall operations. These visualization capabilities will likely include functions such as forecasting, trend analysis, mapping and geolocation tools that run in parallel with network visualization, data storage and sensor input. Having a unified data architecture will also enable these capabilities per validated operational requirements.

Through the offensive cyber operations ICD, the Army is establishing the

framework for the rapid identification, validation, development and fielding of capabilities for the ARCYBER operational forces to generate denial effects in cyberspace that support service and joint operations. This ICD is meant to align existing programs with emerging technologies across the board.

CONCLUSION

Within the next year, these validated requirements and their associated documents will establish the framework for the future acquisition and delivery of cyber capabilities across the Army. Over time, they’ll be used to sustain solutions and guide future capability upgrades and enhancements.

While this is a significant challenge, the good news is there’s a lot of work already done on the acquisition front that is helping shape and address future cyber requirements. For example, as part of the COE, the Command Post Computing Environment (CP CE) displays a range of fires, logistics, intelligence, airspace management and maneuver data on a common, geospatial digital map hosted on a common hardware and software infrastructure. By fusing and running the right analytics on mission command data, the Army could leverage these tools to gain a better situational awareness of cyberspace. CP CE also provides a unified-data capability that will automatically label, redact and share information according to the data’s classification



LINKED IN

The Cyber Operations Center at Fort Gordon, GA, sanitized of classified information for this photo, is home to signal and military intelligence NCOs, who watch for and respond to network attacks from adversaries as varied as nation-states, terrorists and “hacktivists.” Unlike traditional battlespaces, cyberspace blurs the line between traditional notions of offense and defense, with those roles switching constantly. (Photo by Michael L. Lewis)

level, thus preserving cybersecurity while reducing obstacles to collaboration with other nations and agencies.

The immediate priority in any discussion of cyber requirements is to answer urgent needs by continuing to field solutions to our cyber mission forces. As these cyber capabilities are developed, many could be inherently available for other units across the force. The next step is to equip computer network defense service providers at regional cyber centers, and eventually push specific solutions down to Army corps and below.

Getting cyber requirements right for the short, middle and long term is essential to successful network modernization for Force 2025 and Beyond. By moving forward aggressively and structuring our

approach to continuously deliver solutions, we will provide Soldiers a decisive edge to be able to defend against cyber attacks and strengthen DOD’s posture and strategy.

For more information, go to: <http://www.army.mil/asaatl/> or <http://peoc3t.army.mil/c3t>.

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THE DRIVE FOR IMPROVEMENT

Soldiers and Marines test prototypes for the Family of Joint Light Tactical Vehicles (JLTVs) in October 2014 at Fort Stewart, GA. This test included 30 prototypes from three different JLTV vendors. Soldiers and Marines were instructed to drive the vehicles as they would in a combat situation and to provide honest feedback about each vehicle in order to generate the most realistic results. Honest and open feedback, as well as rules of engagement, among the stakeholders in an OT can significantly benefit the solution and the warfighter. (Photo by Tad Browning, USAOTC)



Operational Testing *and the* ACQUISITION Triumvirate

The often-contentious environment of operational testing can be defused by implementing some common-sense approaches early in the process.

by MAJ Adrian N. Watts

An operational test (OT) brings together the acquisition community in an environment where each has a common overall objective: to field the best possible products to Soldiers. However, the paths to such an achievement do not always take the same direction. Thus the test site often becomes the stage where conflicts can play out between stakeholders in real time.

The U.S. Army Test and Evaluation Command (ATEC) team, the U.S. Army Training and Doctrine Command (TRADOC) capability manager (TCM) and the program manager (PM) each has a critical stake in the proceedings and outcome of an OT, leading to situations in which there can be a palpable tension among the three groups. The OT environment is often a high-stakes, high-tempo setting where the stakeholders come together to execute months or years of planning and preparation, often at a high price tag, under considerable scrutiny from top-ranking officials and with the success of the program on the line.

TCM: THE REQUIREMENTS OWNER

In an OT environment, the TCM is the end user's ultimate champion. TCMs ensure that Soldiers have been trained to operate the equipment and that the ensuing test is representative of what is being fielded. A TCM also ensures the logical and realistic integration of doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) considerations into the capability area he or she represents.



PROGRAMS IN ACTION

A dismounted rifle company conducts phase 2 of initial operational test and evaluation for Nett Warrior in November 2014 at Fort Polk, LA. This platoon element effectively cleared the building, aided by the use of Nett Warrior to improve situational awareness, mission planning, land navigation and command and control. Improved situational awareness and planning could reduce the tension between TCM, PMs and ATEC. (Photo by Larry Furnace, USAOTC)

When a capability gap reaches TRADOC's table, the Army Capabilities Integration Center delegates the responsibility to the appropriate TCM office, which has a TRADOC-approved charter for specific capability areas and programs and a variety of avenues to approach a gap solution within the DOTMLPF framework. It's that office's duty to coordinate with other Army leaders and teams to close this gap.

A material solution is just one of several possible approaches. TCMs have the flexibility and the responsibility to take a broader approach using several of the DOTMLPF processes to bridge a capability gap. TCMs must comprehensively monitor DOTMLPF impacts associated with fielding products to units. They involve themselves early in the process through proactive communications with associated PMs and ATEC to ensure that operational requirements are properly addressed in a request for proposals and to monitor test efforts.

For example, the TCM for armored brigade combat teams (ABCTs) may provide DOTMLPF input to both

TRADOC and an ABCT regarding a number of acquisition programs, such as the Abrams, M88 Family of Vehicles, M113 and other tactical wheeled vehicle platforms. The TCM will also pass on appropriate doctrine and lessons learned from other ABCTs, monitor the organizational and personnel force structures to ensure continued relevance, and monitor individual and collective training within the units, among other tasks associated with DOTMLPF integration.

The TCM, commonly known as the combat developer, also creates the doctrine and organizational training support package and provides this to the test agency 6-12 months before the start of an OT. The package serves as a set of guidelines for testing and evaluating capability production document requirements.

THE PM: THE PROCESS OWNER

The PM, as the materiel developer, is the acquisition process owner. From a program's birth to its ultimate disposal, the PM oversees all of the milestones and all of the life-cycle processes between

milestones, while maintaining a balance among program cost, schedule and performance. Because the tenure of an individual PM is typically three years, different individuals often manage different segments of the program's life cycle.

Regardless of when an acquisition officer enters the program's life cycle, the PM's natural inclination is toward success. The Defense Systems Management College defines a successful acquisition program as "one that places a capable and supportable weapon in the hands of a user when and where it is needed, and does so with affordable resources." In this context, a failed test can easily appear to be a roadblock to success.

Excluding or marginalizing the role of the PM in the test process can increase the tension associated with operational testing. The PM, who is likely to have the most knowledge about a product or system and can give valuable input to a test officer (TO) or system evaluator (SE), is especially interested in making sure a fair test is conducted because the success of the program largely depends on it.

“PMs need to be part of the process from start to finish,” said LTC Adrian Marsh, product manager for Ground Soldier Systems within Program Executive Office (PEO) for Soldier. “PMs can give valuable input to the tester and evaluator, can assist with integration and problem-solving, and can help ensure that no test time, which is expensive, is wasted. A lot of this is due to the level of knowledge PMs have about the system under test.”

**ATEC SEs AND TOs:
THE HONEST BROKERS**

The purpose of an OT is to determine whether a weapon, munition or other piece of equipment would be effective and suitable for use in combat. The TO is responsible for the planning, execution and data management of an OT; the SE uses the results of the OT to evaluate the system being tested so that senior

leadership can make informed purchasing decisions. Most TOs are vehemently protective of their tests, as are SEs, who work hand in hand with the TOs and are usually the main ATEC interface with PMs. The main interest of the test and evaluation community is conducting a high-quality test that produces measurable data—positive or negative. Anything that could interfere with the outcome of the test is strictly avoided so that the results are as accurate as possible. Hence, TOs and SEs seek to control as many variables as they can, including test participants and access to the test site.

**FORGING A TRIDENT
FROM A TRIUMVIRATE**

In today’s resource-constrained environment, an OT presents numerous opportunities for clashes among all of the stakeholders, but it is possible to mitigate

some of the resulting tension and create a better test environment for all acquisition professionals.

“We’ve got to get better at building relationships, understanding each other’s requirements and seeking out leaders,” said COL Willie J. Locke III, director of the U.S. Army Operational Test Command (USAOTC) Mission Command Test Directorate. PMs and TCM leaders agree. When asked about relations among the TO, SE and PM in operational testing, MAJ Simeon Wood, assistant product manager for Nett Warrior, said that “an ‘us versus them’ mentality causes more conflict than necessary during operational testing.” He also noted that the training and preparation for an OT often seems one-sided and that the rapport necessary for a better team environment is notably underdeveloped in many cases.

“The team-of-teams concept is vital for us to implement in order to understand the larger concept of getting a quality product fielded,” said Wood. This concept was previously defined by GEN Stanley McChrystal (USA Ret.) as the output of the adaptability, agility and cohesion of a small team combined with the power and resources of a large organization. In the OT realm, each of the smaller teams (PM, TCM and SE/TO) has this type of backing from parent organizations (PEO, TRADOC, ATEC), but the notion that the smaller teams can also operate as a single team to achieve a successful test could truly alleviate much of the us-versus-them mentality MAJ Wood describes.

Undoubtedly, much of the tension could also be resolved by getting to know each other better as acquisition professionals. Doing so facilitates trust. In the sports world, players on a team have unique positions but are united by a common



DATA ROUNDUP

Soldiers from the test unit at Network Integration Evaluation (NIE) 14.2, in spring 2014 at Fort Bliss, TX, pick up and program Nett Warrior’s end user devices (EUDs) from the data collection point. Mission requirements have steadily increased the demand for EUDs in units across the Army. OTs are often about integration of equipment, but integration of personnel and their expectations would also be valuable. (Photo by Tad Browning, USAOTC)



SYSTEMS INTEGRATION

A civilian works on validating a system at the NIE Integration Motor Pool, March 12. The PM, TCM and operational test communities need to establish ROEs to help these teams become a team of teams. (Photo by Vanessa Flores, Assistant Secretary of the Army for Acquisition, Logistics and Technology System of Systems Integration Directorate Public Affairs)

goal: winning. But to win, each player must respect and trust the others to do their jobs. The same holds true for the acquisition community. We must strive to better understand the way our positions interact and how we can better interact with one another. It is through this shared understanding, coupled with the team-of-teams concept, that our professional relationships are cultivated and all players are motivated to unite behind the same goal.

“One of the greatest assets in a successful operational test would be the level and amount of participation in the test and evaluation working integrated process teams,” said MAJ Rhea Pritchett, who works in the TCM Office for Networks and Services at Fort Gordon, GA. “When these meetings lack involvement, people stop talking, and then every issue becomes a potential red star cluster,” that is, when small issues get blown up into crises and emergencies.

If all parties are actively involved from the early planning stages to the end of the test, then the proper expectations are clear to all, and valuable insight and input are integrated from the onset. Problems can

also be solved early on and at lower levels, Soldiers receive better training on the test products as a result of better input integration, and a clear system of checks and balances is established to ensure the transparency of the process.

CONCLUSION

“What we really need is a clear set of ROEs [rules of engagement],” said Gene Borrero, division chief, Enterprise Information Systems Test Division, Mission Command Test Directorate. “This would be really beneficial to all parties if established well before the test.” ROEs are established quite often during OTs, but are mostly informal and not necessarily known to all involved. Formal ROEs that are agreed upon during the planning stages and published in a wider format for all participants to view and understand could lead to a greater appreciation and respect for each professional’s role in the test. Rules that guide the conduct of training for Soldiers on the equipment to be tested, test-site visitation, focus group or survey attendance and escort requirements are just a few of several potentially contentious areas that could be resolved through a clear set of ROEs.

All of the OT stakeholders play important, interconnected roles in the test process and, although challenges exist, there are definite ways to moderate or eliminate such problems. “Even a failed test is an opportunity to make something better,” said COL Charles Stein, project manager for Defense Communications and Army Transmission Systems. “The OT is the Super Bowl where we can test our mettle—or metal, in the case of equipment—where it counts: with the Soldier,” he added.

For more information, contact the author at Adrian.n.watts.mil@mail.mil. Acquisition officers interested in working in testing Army systems and equipment should contact their branch manager about future assignment opportunities at the USAOTC or visit the USAOTC website at <http://www.otc.army.mil>.

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KILLING *the* 'CREEP'

JLTV is one of the first major programs to implement DOD's competitive prototyping policy to fill a gap in today's light tactical vehicle fleet, balancing payload, performance and protection. Preventing test creep has been a major concern in that effort, which is why the project office and the program's stakeholders worked to ensure that testing efforts weren't derailed by unplanned and unfunded test data requirements.

by LTC Misty L. Martin, Ms. Danielle Wayda, Mr. Steve Martin and Mr. Josh Pagel

The Joint Light Tactical Vehicle (JLTV) program is one of the first to implement DOD's competitive prototyping policy. Established in 2007, the policy stipulates that two or more competing original equipment manufacturers (OEMs) must produce prototypes to reduce risk, maximize performance, decrease costs and synchronize requirements. Simply put, this means that in addition to the normal test objectives and issues, all JLTV OEM vehicle prototypes were required to be tested consistently, fairly and separately.

The JLTV program's engineering and manufacturing development (EMD) phase concluded in late 2014 after an aggressive, 14-month test schedule specifically intended to generate data sufficient to inform the Source Selection Evaluation Board (SSEB) and the capability production document (CPD) development, and provide data for the Milestone C (MS C) decision. Each of the many testing categories contained numerous subtests addressing requirements and required diligent management to avoid costly "test creep"—unplanned and unfunded test data requirements identified after the start of test execution. Simply put, test creep adds risk—in cost, schedule and performance—to programs and can delay or even end an otherwise successful program. Successfully avoiding these impacts to the program's tight schedule and budget required detailed planning and budgeting, careful management and control, and



constant communication with a diversity of stakeholders: the U.S. Army Test and Evaluation Command (ATEC); the Office of the Secretary of Defense's director of operational test and evaluation; the deputy assistant secretary of defense for developmental test and evaluation; the Marine Corps Operational Test and Evaluation Activity (MCOTEA); and Army and Marine Corps combat developers. The JLTV program yielded a number of lessons learned that will be shared with other programs employing a competitive prototyping strategy.

The tight schedule and extensive EMD testing, combined with heel-to-toe vehicle testing, required JLTV Product Manager for Test (PdM Test) team to thoroughly understand when to push back on test creep. For example, simply asking what the program and stakeholders would gain by conducting more testing, and then showing the corresponding low return on investment was sometimes what stood between staying on schedule and under budget, and creating program schedule and cost overruns.

There were instances when test creep was a reality, and no amount of discussion could put or keep it at bay. Weeks of assertive back-and-forth dialogue on the test and evaluation master plan (TEMP) were spent on "in the weeds" details. The program office's position emphasized that those details should have been included in a detailed test plan (DTP), as opposed to the TEMP, in which they are considered binding regardless of any risk-benefit analysis.

The key to this effort focused on striking a balance and obtaining stakeholder buy-in to what is too much, which could cause program failure resulting from restrictive wording, and what is not enough, which could cause future funding issues. Requirements management is the program's foundation. This foundation must be rock-solid without allowing test creep to erode it.

EMD PLANNING

In planning for JLTV EMD, the program team had to clearly understand what we were providing the warfighter and the risks associated with building it.

Each test category contained numerous subtests addressing specific requirements. For example, automotive performance testing included soft-soil mobility, sand-slope traversing, braking, steering and handling, ride quality, fording, fuel consumption, top speed, acceleration, grades and slopes, as well as several other tests. Ballistic testing required additional test assets at the subsystem level (nine armored chassis plus numerous armor coupons or armor samples) in addition to the 27 system-level test assets included in the 66 test assets overall.

Test planning and DTP development were a several-month endeavor that involved multiple draft revisions, requiring weekly (and often daily) communication between the test-site subject-matter experts and our PdM Test team.

PdM Test emphasized a collaborative effort among JLTV PdM Test, ATEC's U.S. Army Evaluation Center (AEC), MCOTEA and the various test sites, which ensured an appropriate balance between adequately testing the requirement and over-testing.



THE RIGHT CHOICE

To test three prototypes during the JLTV program's EMD phase, Soldiers and Marines participated in a training exercise facilitated by the U.S. Army Operational Test Command on Fort Stewart, GA, in October 2014. (Photo courtesy of JPO JLTV)

AEC's data source matrix (DSM) defined the data that AEC and MCOTEA (the evaluators) needed to assess the JLTVs' effectiveness, suitability and survivability. As such, DTP development focused on the testing needed to provide this data. The JLTV purchase description added test data requirements above the DSM, as it was determined to be critical for the SSEB. Subsequently, those requirements were also included in the DTPs.

This process also ensured that all stakeholders shared a common understanding of the test procedures, mitigating test creep caused by miscommunication on how requirements were to be tested. Given test program cost and schedule constraints, the Joint Program Office (JPO) JLTV, in coordination with stakeholders, determined which requirements did not need to be tested and could be evaluated through other means. Therefore, a requirements prioritization based on DSM data needs, as well as CDD-driven tier-level criteria (e.g., key performance parameters, key systems attributes versus others) provided guiding factors.

Once the DTP drafts were complete, it was imperative that other stakeholders, such as systems engineering, logistics and the JPO product directors—organizations responsible for managing each respective EMD OEM—review the documents to ensure that their respective concerns were addressed.

Test execution, to a greater extent than test planning, required constant interaction of the JPO JLTV, PdM Test, logistics, the budget management office, systems engineering, product directors and the test sites. Daily test update briefs (TUBs) and daily written test status reports ensured that all stakeholders were aware of current test status, which enabled timely identification and mitigation of test-related issues. Weekly test-site test-completion updates were also an important element in managing the test schedule.

THREAT NEUTRALIZED

Efforts to minimize test creep began early in the test planning stages. By limiting testing to those test events needed to

PdM Test's goal is to maximize test efficiency and effectiveness during the production phase by eliminating redundant testing ... as well as employing test design techniques to ensure efficiency in producing statistically significant and defensible test results.

Major
JLTV
EMD Test Events



These test events addressed program requirements:

- Performance Testing
- Transportability
- Command, Control, Communications, Computers, Intelligence and Interoperability
- Reliability, Availability and Maintainability
- Ballistic Coupon Testing
- System-level Live Fire
- Limited User Test

ACQUISITION TRAILBLAZER

The JLTV program is one of the first to implement DOD’s competitive prototyping policy, which stipulates that two or more competing OEMs must produce prototypes to reduce risk, maximize performance, decrease costs and synchronize requirements. (Image courtesy of the Program Executive Office for Combat Support and Combat Service Support)

produce data to satisfy DSM needs, the JPO reduced extraneous testing from the test plans. PdM Test monitored test progress (versus schedule) on a daily basis, which enabled decisions regarding retest of failed items after corrective actions were implemented versus adhering to the test schedule and proceeding to the next test event. These were typically case-by-case decisions dependent on several factors based on priority (requirement priority, e.g., key performance parameter or not, test duration, etc.) The TUBs ensured that everyone, including PdM Test leadership, had all of the facts before providing guidance.

Ballistic testing was one of the test program’s big success stories in demonstrating how early planning eliminated any push for test creep. The team successfully reduced testing by understanding requirements and worked closely with

the live fire integrated product team to reduce shots where OEM designs made reductions feasible. This abbreviated the test schedule and reduced cost. Deferring certain testing to the low-rate initial production phase, to be conducted on a single OEM, resulted in additional cost avoidance.

CONCLUSION

The JLTV EMD phase’s success can be attributed to open communication within the program office and among all stakeholders, a solid understanding of the risks the JLTV program faced, constant risk management and mitigation, and test-creep control. PdM Test successfully achieved EMD test phase objectives, ensured that requirements were tested, and provided the program with the necessary data to support the SSEB, CPD development, and ultimately, the JLTV MS C decision. PdM Test successfully

managed and oversaw the execution of a complex test program that enabled implementation of the competitive prototyping policy with all three OEMs, all while remaining on schedule and under budget. The JLTV program promises to yield a number of lessons that can be leveraged by similar programs with a competitive-prototyping strategy.

Those same principles must be applied in JLTV’s next phase. We learned from the last phase that we cannot buckle to each want and whim, as doing so can be detrimental to the program. We must consider and balance each request and maintain constant awareness of the planned end state. Late-game test creep will only slow or halt what has been, to date, a very successful program.

Test programs cannot be developed without planning, budgeting and

communication. Once developed, they must be managed, constantly communicated and controlled. Test creep cannot be allowed to create havoc; testing must be conducted to address a specific requirement and must consider risk.

PdM Test and the JPO JLTV (consisting of engineers, logisticians and quality assurance, budgeting and contracting personnel) are reviewing and assessing the EMD phase test results to better understand areas of performance risk, and will provide ATEC with recommendations to improve test efficiency and effectiveness. PdM Test's goal is to maximize test efficiency and effectiveness during the production phase by eliminating redundant testing—analyzing risk and target tests accordingly—as well as employing test design techniques to ensure efficiency in producing statistically significant and defensible test results. EMD phase lessons learned in all functional areas within the JPO JLTV will be carried over into the production phase beginning in this fiscal year's fourth quarter to ensure successful program execution.

For more information, go to <http://www.peocscs.army.mil/>.

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THOROUGH ANALYSIS

JLTV's PdM Test team records vehicle weight during the limited user test. The program's EMD phase concluded late last year after an aggressive, 14-month test schedule, with 300 test team members collecting data at 17 test sites. (Photo courtesy of JPO JLTV)

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Wrangling Radio REQUIREMENTS

Using lessons learned from software-defined radio development, TRADOC and PM Tactical Radios have developed a unified approach to requirements development, informed by feedback from industry and the user community, that evolves requirements and technologies incrementally.

by COL James P. Ross and Mr. Paul Chernek

Software-defined radios are an integral part of the Army's future mission command network and the way of the future for tactical communications at the lowest echelons. Unlike older non-networking radios, software-defined radios transmit information using high-bandwidth waveforms, which function like a wireless network to allow Soldiers to exchange voice, data and video over the air. With this secure waveform software loaded onto radio "boxes," the radios act as network nodes that can route and retransmit information in austere environments, including around obstacles and beyond line of sight. Together, the radios and waveforms provide digital communications on-the-move down to the Soldier level.

Technical advances to hardware and software, including radios that support multiple waveforms and waveforms that provide more capability and flexibility, have led to significant changes in the Army's approach to tactical radio procurement and fielding by enabling the government to manage the waveforms and lean on industry to fill the hardware requirements. Our strong partnership of the Army acquisition community, the U.S. Army Training and Doctrine Command (TRADOC) and industry is allowing us to adjust and improve tactical radio requirements to support Force 2025 and Beyond.

EARLY JTRS

When the Joint Tactical Radio System (JTRS) program began in 1997, the concept of a software-defined radio was just beginning. Recognizing the technology's potential, the military at first tried to pack as many features into individual radios as possible. The thinking was that "software-defined" meant there would be little impact on the hardware. However, one of the lessons learned during this time was that adding numerous capabilities to the radios affected the hardware and did not always yield the best product. For example, original requirements for the two-channel Manpack Radio had it supporting more than two dozen waveforms for various communications features and an outdated internal barometer for positioning. Such requirements made the radio exceedingly large and heavy—and its power requirements rendered it operationally useless.

Working to refine the requirements, the Army eliminated the barometer and reduced the number of waveforms for the Manpack Radio to three—Soldier Radio Waveform (SRW), Single Channel Ground and Airborne Radio System (SINCGARS) and ultra-high frequency Tactical Satellite, with the Mobile User Objective System added when its waveform development was completed. With fewer waveforms, the radio could still fulfill



ADVISE AND PROTECT

A Soldier from the 3rd BCT, 101st Airborne Division (Air Assault) (3-101 ABN) communicates using a Manpack Radio while other 3-101 ABN troops conduct force protection during an advising visit to the Afghan police Regional Logistics Center, Nangarhar province, Afghanistan, in February. Using the NDI approach means that Soldiers will be able to take advantage of rapidly advancing software-defined radio technology. (U.S. Army photo by CPT Jarrod Morris, Train Advise Assist Command – East Public Affairs)

its mission—to pass voice and data simultaneously and “bridge” platoons into the Army network—in a more user-friendly and power-efficient package. The low-rate initial production version of the Manpack began fielding to brigade combat teams (BCTs) in 2013.

Another JTRS lesson learned came with the Ground Mobile Radio (GMR), a four-channel radio with even more ambitious requirements that experienced problems with size, power consumption and start-up time. After more than 10 years of development, the GMR program was restructured in 2011. The Joint Program Executive Office for JTRS was stood down and eliminated in 2012, with the Army’s radio procurement mission transferred to the Program Executive Office Command, Control and Communications – Tactical (PEO C3T) and renamed as Project Manager Tactical Radios (PM TR).

Through the JTRS experience, the Army learned the hard way that software-defined radios were still hardware-dependent, and our requirements needed to reflect that. Just as today’s smartphones undergo hardware refreshes every few years to support the newest operating systems, radio hardware must continuously evolve in parallel with waveform software. That reality—and the maturity achieved in the commercial, software-defined radio

market as a consequence of the JTRS developmental effort—led the Army to a new approach and a new look at how we define the requirements to get radios right.

THE NDI APPROACH

Over the past two years, as more and more radio vendors matured their hardware to successfully port government-owned, nonproprietary waveforms onto their radio platforms, the Army implemented a new “radio marketplace” acquisition approach that aims to cut costs and deliver radios more quickly using non-developmental item (NDI) products. This approach relies on industry to provide already developed, mature radios that can meet specific requirements and are compatible with government-owned waveforms.

The first radio to be procured using the NDI strategy was the Mid-tier Networking Vehicular Radio (MNVR), the successor to the GMR. Using the Wideband Networking Waveform, SRW and legacy waveforms such as SINCGARS, MNVR closes a critical data gap on the battlefield by connecting the lower-tier tactical network at the company level with the upper tier at battalion and brigade levels. After full and open competition, the MNVR program purchased an initial set of 232 radios in September 2013, and those radios are being used for testing, assessments, certification



STAYING CONNECTED

Soldiers train on the MNVR at Fort Huachuca, AZ, in 2014. MNVR connects the lower-tier tactical network at the company level with the upper tier at battalion and brigade. It is the first radio to be procured using the NDI strategy that relies on industry to fill the hardware requirements for the radio. (U.S. Army photo)

and platform integration prior to planned fielding in FY17.

The Army is now using the NDI approach to procure the next generation of radios in the PM TR fleet, including the full-rate production HMS Rifleman and Manpack radios and airborne radios. Similar to the smartphone concept, the HMS (Handheld, Manpack and Small-form Fit) acquisition strategy includes frequent competitions for delivery orders that will allow the Army to incrementally refresh its radio hardware as needed, as technology advances.

The NDI approach will incentivize industry innovation and deliver better radios to Soldiers as they become available on the market. From a requirements perspective, however, this path ahead poses unique challenges—and opportunities.

REQUIREMENTS PARTNERSHIP

Writing requirements for an NDI purchase is a balancing act: The requirements must

give vendors enough specifics to direct their research and development investments, yet also allow room for incremental innovation and improvement. In developing a request for proposals (RFP), PM TR works closely with the TRADOC capability manager for tactical radios (TCM TR) to shape the requirements for each radio as part of the capability production document (CPD), which defines the necessary elements for each radio. Soldier feedback informs requirements to ensure that the radios meet user needs and expectations. Industry also informs the requirements based on what they know to be technically feasible today and in the future. We also leverage the latest technologies emerging from research and development efforts at the U.S. Army Research, Development and Engineering Command's Communications-Electronics Research, Development and Engineering Center to additionally refine the radio requirements.

One way that we gather information is through requests for information (RFIs). The RFI process gives vendors an

opportunity to ask and answer questions about the proposed requirements, and the Army uses the responses to determine if the requirements are achievable and if any changes need to be made before an RFP is released.

To incorporate the user perspective, the Army gathers information from TRADOC's Maneuver Center of Excellence (MCoE), which works with mission-command elements of BCTs. In response to feedback from the MCoE for a lighter dismounted Manpack Radio, the Army released an RFI to help determine if and when a reduced weight could be achieved and what capability trade-offs would be involved. Feedback from the RFI will help refine requirements for the radio over time, which will become part of the CPD and feed into the full and open competition for the Manpack.

We also worked together to include the requirements for a secret-and-below version of the Rifleman Radio, when dismounted leaders started using the handheld radio in conjunction with the secret-level Nett Warrior device. The original AN/PRC-154 version of the Rifleman Radio did not pass classified data such as Soldier position location information. By amending the CPD and modifying the existing low-rate initial production Rifleman contract, the AN/PRC-154A Rifleman Radio was certified for secret-and-below information and can seamlessly attach to the Nett Warrior to pass messages and GPS locations.

The Army has added several potential Rifleman Radio features as objective requirements, which indicate to industry the improvements the Army is seeking in the future. When we released the RFP in January for full-rate production of the Rifleman Radio, we added a two-channel option as an objective

RADIO TOUR

Author COL James P. Ross, PM Tactical Radios, left, and COL Rob Collins, PM Distributed Common Ground System – Army, second from left, toured several units employing their equipment, including MNVR, tested during the Network Integration Evaluation at Fort Bliss, TX. Accompanying them were GEN Daniel B. Allyn, vice chief of staff of the Army, and then-BG(P) John W. Charlton, commanding general, Brigade Modernization Command. (Photo courtesy of COL James P. Ross)



requirement in response to Soldier input and feedback from the MCoE. The two-channel capability will eliminate the need for dismounted leaders to carry two radios—a Rifleman running SRW and a Multiband Inter/Intra-Team Radio that uses the older SINCGARS waveform. Another objective requirement for the Rifleman Radio is a mounted configuration, which will allow Soldiers to use it in a vehicle in place of the two-channel Manpack Radio when only a single channel networking SRW capability is required for certain missions.

By partnering with other PEOs, PM TR maximizes the effectiveness of radio requirements in the NDI environment. Working with PEO Ground Combat Systems and PEO Combat Support and Combat Service Support, which integrate the Manpack Radio onto their vehicles, we have added a contractual requirement for a universal mount. With multiple vendors developing future iterations of the Manpack Radio, a universal mount will allow smoother integration onto any vehicle.

CONCLUSION

As we structure requirements to incrementally improve technology through the radio marketplace, we know that radios are just one piece of an integrated battlefield network. Several

components of this network—including the radio hardware, waveforms, network operations tools, mission-command applications and ancillary items—need to work together so Soldiers can communicate successfully.

Until recently, however, requirements for these components were developed independently and were not always integrated across the network. To eliminate this stovepiped approach, TCM TR is creating an integrated tactical network environment (ITNE) information system capability development document (CDD) that will link all of the components of the lower tactical Internet into one overarching document. While each component will continue to have its own CPD with specific requirements, the CPDs will link back to the ITNE CDD, which will help close the seams between these technologies and improve interoperability on the battlefield.

As an information system CDD, the ITNE will also offer the flexibility to change the capabilities over time as technology improves. The document goes through the Joint Requirements Oversight Council approval process once, and then allows for subsequent upgrades through incremental changes to hardware and software.

The Army has successfully applied lessons learned from software-defined radio development, and is moving forward with a unified approach informed by feedback from industry and the user community. Through our partnership, we will continue to incrementally evolve the requirements and technologies to deliver Soldiers the capabilities they need to communicate today and in the future.

For more information, go to <http://peoc3t.army.mil/c3t/> or <http://www.tradoc.army.mil/>.

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WORKHORSE

Paratroopers from the 2nd Battalion, 319th Airborne Field Artillery Regiment, 82nd Airborne Division Artillery fire rounds from an M119A3 howitzer at Fort Bragg, NC, during Combined Joint Operational Access Exercise 15-01, the largest bilateral exercise held at Fort Bragg in almost 20 years. In service for more than two decades, the M119 series of howitzers is a proven workhorse now made better. (Photo by SSG Jason Hull, 82nd Airborne Division)



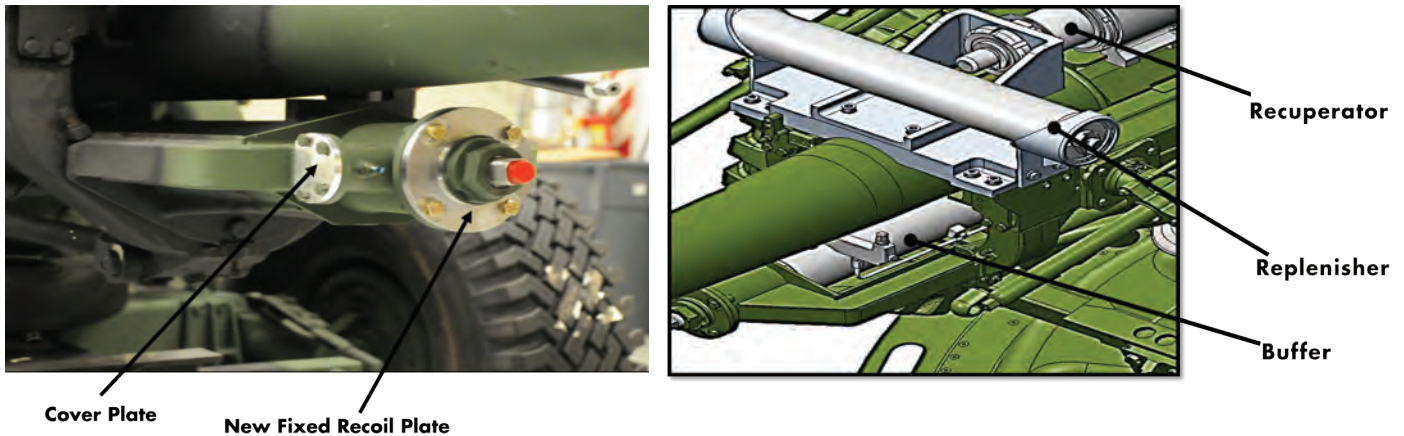


BOUNCE

When field reports indicated a need for changing the recoil system of the M119 howitzer, PM TAS teamed with Rock Island Arsenal and ARDEC to develop a solution that improved performance and safety and cut program costs.

by MAJ Wade Perdue

More than two decades have passed since the first M119 howitzer rolled off the production line at Rock Island Arsenal – Joint Manufacturing and Technology Center (RIA-JMTC), yet it remains one of the Army’s primary direct and indirect fire support assets. This lightweight, air-mobile, towed howitzer has been the workhorse for the Army’s infantry brigade combat teams’ direct support artillery battalions. Over the past 13 years, it has seen extensive use in both Operations Enduring Freedom and Iraqi Freedom (OEF and OIF). The Army has employed this howitzer in some of the most austere conditions in the world, firing multiple-round, high-angle, high-charge missions on a daily basis in support of combat troops. High-angle fire is used for firing into or out of deep defilade such as that found in heavily wooded, mountainous and urban areas. It is also used to fire over high-terrain features near friendly troops.



COMPONENTS OF THE M119A3 RECOIL SYSTEM

The redesigned recoil system consists of a new recuperator, external replenisher and a new buffer (recoil brake). The new fixed recoil plate sets recoil stroke to a constant length of 25 inches, removes the variable recoil linkage and replaces the existing bearing housing. (SOURCE: MAJ Wade Perdue, PM TAS)

To counteract the effects of these high operational-tempo combat conditions and to increase the survivability of the howitzer, the Project Manager for Towed Artillery Systems (PM TAS), which manages the M119A3 howitzer within the Program Executive Office for Ammunition (PEO Ammo), has developed an ongoing system modernization program.

Through this program, the howitzer has received several significant upgrades that improve performance, maintainability and safety. The most recent upgrades incorporated into the current configuration include digital fire control; increased low temperature capability, from -25 to -51 degrees Fahrenheit; and the M20 breech.

PM TAS has now shifted its attention to upgrading the howitzer's legacy recoil system, which in the past has been plagued with reliability and maintainability issues. PM TAS is working with the U.S. Army Armament Research, Development and Engineering Center (ARDEC) and RIA-JMTC on a program to enhance reliability and maintainability and reduce current manufacturing complexity, which in turn results in an overall reduced module cost.

WHY REDESIGN?

Although the M119 has proven to be one of the most reliable and responsive fire support assets over the past two decades, its Achilles' heel has been the legacy recoil system. Field reports from OEF and OIF, relayed through formal systems and in anecdotal reports, have exposed shortfalls with the legacy

system that negatively affect performance as well as sustainment costs. Shortfalls of the legacy system include reliability issues in the form of frequent seal leakage from both the recuperator and buffer, resulting in increased maintenance time. Additionally, the variable recoil linkage, which sets the recoil length based on the elevation of the gun, is prone to breaking and binding. Both modules are rigidly mounted, allowing little or no movement, which causes binding and premature wear of the metal parts and seals within the buffer and recuperator.

As the operational artillery community drives the requirements for a higher-performing, more reliable recoil system, the sustainment side drives requirements for overall system cost. The legacy recoil system is very complex and includes a lot of moving parts. This complexity means constant maintenance and adjustment during normal and combat operations, resulting in high replacement rates. Supplying spares to keep up with the high demand can be difficult because of the complexity of manufacturing the required parts. Additionally, the assembly process requires specialized tooling, increasing costs and leading to problems with availability.

RECOIL SYSTEM COMPONENTS

The M119 howitzer's recoil system consists of a recoil brake (a damping system) and a hydropneumatic recuperator (a gas spring system). A recoil system's main function is to absorb and control the rearward movement of the cannon and return it to its original firing position, thus avoiding violent shock to, or movement of, the carriage. The buffer, the damping aspect of

FINE TUNING

Soldiers from 3rd Battalion, 7th Field Artillery Regiment, 3rd Brigade Combat Team (BCT), 25th Infantry Division adjust their M119A3 howitzer as they occupy a firing point on Area X-Ray during Exercise Lightning Forge in March. High-angle, high-charge firing showed the recoil system on the earlier iteration of the howitzer to be its Achilles' heel. The M119A3 improves the recoil system using existing parts. (U.S. Army photo by SGT Brian C. Erickson, 3rd BCT Public Affairs)



the system, absorbs the reaction forces of the firing howitzer and brings it to a controlled rest within a determined length along the sleigh, the part of the carriage that provides immediate support for the howitzer tube and houses the recoil system. The recuperator, precharged with gas, uses the rearward movement of the cannon to increase its gas pressure, creating the energy to return the cannon to its original firing position.

The redesigned system modifies and simplifies some of the components, but operates on the same fundamentals as the legacy system. The new design modifies

the buffer by splitting the front head of the legacy buffer into two pieces, compensating for potential misalignment within the system and internal recoil length. The redesigned recuperator is a modified version of the legacy version with a majority of the components removed. This is possible because of the Suspension Lockout System (SLOS) and fixing the recoil length at 25 inches. The SLOS is an easily installable, field-deployable device used to stabilize the M119 during high-angle firing. It removes the problematic variable-recoil hardware, and works in conjunction with the fixed recoil system to reduce accelerations and stresses on the

carriage and lower buffer rod forces. In the legacy recoil system, recoil length varied from 14.5 inches to 42 inches depending on the elevation of the gun. The combination provides more stability by reducing platform displacement, resulting in more responsive fires and making it safer for the Soldier to operate.

COMPONENT REUSE CUTS COST

When redesigning a system as complex as the M119 recoil system, the challenge is to improve reliability, availability and performance to meet threshold requirements while controlling the overall cost. In addition to increasing reliability and stability and eliminating the frequent need to add or remove oil, the recoil redesign also reduces the overall weight of the system by approximately 45 pounds, a significant weight reduction. Using a combination of unmodified and modified legacy parts along with the newly manufactured ones reduced overall costs. The legacy system consists of approximately 124 total parts. The redesign will reduce that number by 40 percent to approximately 75, reusing 47 parts from the legacy system—65 percent—and manufacturing 28 new parts. The redesign efforts will reduce the estimated cost

During the prototyping, PM TAS, the program manager, ARDEC and RIA-JMTC developed a partnership approach that leveraged each group's strengths: The ARDEC engineers provided technical and engineering support, while RIA-JMTC provided manufacturing process support and valuable feedback on the technical data package.

of the recoil system from \$60,000 to \$40,000.

Although the number of parts has been reduced, the system is as functional as but more reliable than the legacy system and meets all the threshold requirements. Incorporating the SLOS and the M20 breech with the recoil redesign maintains functionality. As with any artillery weapon system, excessive movement during firing adversely affects performance, with the problem being most pronounced at high-charge zone, high-angle firings.

LAST STEPS: PROTOTYPING AND PRODUCTION

PM TAS, ARDEC and RIA-JMTC developed an extensive prototyping effort that targeted program affordability and cost before making a full-rate production decision. Working with the U.S. Army TACOM Life Cycle Management Command, ARDEC engineers obtained several Code F (unserviceable but repairable) recoil modules that were used in the prototyping effort. The Code F modules from TACOM and PM TAS were sent to RIA-JMTC, which handled

teardown and inspection. RIA-JMTC, along with ARDEC engineers, oversaw reworking of legacy parts and manufacture of new parts from the technical data package, and RIA-JMTC assembled the recoil modules. Then strength-of-design testing began. The prototyping effort at RIA-JMTC gave the PM TAS-ARDEC team the opportunity to work directly with manufacturing experts at RIA-JMTC, who provided valuable feedback on the technical data, highlighting design changes that increased manufacturability as well as cost savings.

The original acquisition strategy was to decide if, after the completion of the prototyping effort, commercial industry or RIA-JMTC would produce the new system. However, as coordination for the make-buy decision proceeded, it became apparent during the prototyping that the best value for the Army, taking into account cost, schedule, performance and risk, was to have the M119A3 recoil redesign production effort performed by RIA-JMTC.

During the prototyping, PM TAS, the program manager, ARDEC and RIA-JMTC developed a partnership approach that leveraged each group's strengths: The ARDEC engineers provided technical and engineering support, while RIA-JMTC provided manufacturing process support and valuable feedback on the technical data package. This relationship, along with constant, open and candid communications, is the underlying reason the prototyping effort was so successful.

RIA-JMTC has all the critical tooling and machining needed to manufacture new parts and rework any reused legacy parts. The hydraulic clean room, where the teardown and assembly of the recoil modules is accomplished, features state-of-the-art

tools and fixtures. For the manufacturing portion, RIA-JMTC's in-house test facilities cut testing expenses by more than half. Program discussions indicated that the estimated cost for industry to perform the testing would have been \$43.7 million; RIA-JMTC was able to execute testing for \$20.7 million.

CONCLUSION

In addition to providing a more reliable and less maintenance-intensive howitzer, the recoil redesign project is an example of expanding the operational capabilities of the field artillery while maintaining cost. The largest portion of savings for the recoil redesign program is gained from reusing and modifying 65 percent of the legacy system parts, making an existing system better at a fraction of the cost.

Even in the current resource-constrained environment now facing the Army, the need for modernization does not stop. The future challenge will be to keep up with this high demand for modernization with limited resources. By maintaining strong relationships with the combat development community and the organic industrial base, which have proven that they can produce a high-quality product on time and within budget, PM TAS has set the conditions to meet future modernization needs for light field artillery.

For more information, contact the author at wade.perdue.mil@mail.mil.

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When redesigning a system as complex as the M119 recoil system, the challenge is to improve reliability, availability and performance to meet threshold requirements while controlling the overall cost.

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GROUND TRUTH

Harnessing lessons learned to achieve better requirements

by Ms. Jill Iracki

Well-defined requirements are a key factor in the success of acquisition programs. Program offices must ensure that requirements are realistic, relevant and clearly communicated to vendors so that they can translate into a usable and beneficial capability for the Soldier. In today's defense acquisition management system, common concerns include the need to modify requirements as threats evolve, the ability to allow trades between system requirements and program cost and schedule, and preventing requirements creep—the tendency of the user or other program stakeholders to add to the original performance requirements for a system while it is still in development.

Through the Acquisition Lessons Learned Portal (ALLP), the acquisition community shares lessons that pertain to all aspects of executing Army acquisition programs, including generating, refining and communicating the requirements that steer system capabilities. Sharing these lessons learned throughout the Army acquisition enterprise allows all acquisition professionals to benefit from the experiences and knowledge of program managers (PMs), their staffs and acquisition stakeholders. In the area of requirements, following are lessons learned in revalidating operational needs, request for proposal (RFP) considerations, ensuring that requirements are realistic and relevant, and controlling requirements creep and using Better Buying Power (BBP) to help.

LL_635: Revalidate early program assumptions and estimates for initial operational capability (IOC) and final operational capability (FOC) quantities before the milestone event.

Background

For one program’s Milestone C review, the basis-of-issue plan was a key topic. Army programs use this requirements document to plan and manage the introduction and distribution of new equipment, including the planned quantity. IOC and FOC quantities had been calculated and validated during the Joint Capabilities Integration and Development System approval process. Because of changes in Army structure, priorities and funding over the two years since approval of the program’s capability production document (CPD), revalidation was requested to show that the IOC and FOC quantities were in sync with current Army needs. Initial analysis by the U.S. Army Training and Doctrine Command capability manager indicated a new lower FOC quantity.

Recommendation

Confirm required quantities with user representative and program office estimates. Update the acquisition program baseline to reflect changes in assumptions and estimates. This will keep the program in sync with the latest Army strategy and priorities and reduce the potential to procure quantities that do not reflect current Army needs.

LL_893: Be proactive about creating mechanisms throughout the life cycle for user, engineering and scientific feedback that can create flexibility to overcome challenges and environmental changes.

Background

The Army has compared the current defense acquisition system with that from the era of its now famous Big Five: the Abrams main battle tank, the Bradley Fighting Vehicle, the Apache attack helicopter, the Black Hawk utility helicopter and the Patriot air defense missile system. Despite overcoming major challenges, the Army views the Big Five as some of its most successful acquisition programs and would like to replicate that success within current acquisition programs. However, the acquisition process has become more standardized, formalized and rigid since the Big Five were first conceived, developed and acquired. The rigidity of the acquisition process requires locking in requirements when they are most unknowable and leaves little room to adjust these requirements as the scope of what is feasible becomes more defined.

Recommendation

Put a premium on integrating users, engineers, operators and technologies throughout the life of a program, and continuously reevaluate assumptions and their implications. Successfully integrating their feedback and remaining flexible will lead to continuously refining and tightening requirements, thereby making the weapon system both more capable and more useful.

RFP CONSIDERATIONS

LL_623: Establish tiered threshold requirements in the RFP to create a pre-negotiated trade space of requirements that will aid in source selection evaluation and program execution.

Background

The strategy of modifying an off-the-shelf system raised concerns about how the balance of redesign versus acceptance of “good enough” performance would

be handled and how the PM could be sure that suppliers can actually meet the numerous threshold requirements identified. The PM worked with the user community to tier the threshold requirements to allow for trade space. This allowed the evaluation board to evaluate the system’s performance with respect to the level of importance of each requirement.

In the source selection RFP, Section M identified a prenegotiated trade space of threshold values to be used in the evaluation:

- (T) Threshold requirements and specific parameters are mandatory.
- (TT1) Threshold requirements are mandatory; specific parameters are highly desirable but not mandatory.
- (TT2) Threshold requirements are mandatory; specific parameters are desirable but not mandatory.
- (TT3) Threshold requirements are desired.

Recommendation

Establish tiered threshold requirements in source selection RFP Section M similar to those above. Consider the same type of requirements structure for source selections. Significant delays in evaluation can be avoided by discretely analyzing a reduced set of threshold criteria.

LL_636: The program office should obtain the Joint Requirements Office (JRO)-approved capability development document (CDD) before releasing an RFP. Complete a traceability matrix to use in drafting the RFP and contract.

Background

One Army program did not have an approved CDD before the release of the

TRAINING GROUND

Soldiers assigned to Train Advise Assist Command – East (TAAC-E) provide security and communications during an advising visit to the Nangarhar police Regional Logistics Center in January. Integrating all stakeholders and technologies throughout the life of a program, along with continuous reevaluation of assumptions and implications, can lead to better requirements more suitable to the current, budget-constrained acquisition environment. (U.S. Army photo by CPT Jarrod Morris, TAAC-E Public Affairs)



RFP. This caused program challenges in determining what development work was required, getting it on contract and securing the additional money and time in the schedule for the work to be completed.

Recommendation

Construct a requirements traceability matrix based on a JRO-approved CDD when drafting the RFP and contract. Identify implied stakeholder and technology requirements. Ensure that the requirements are clearly and accurately defined in the RFP and the contract. When evaluating the proposal, ensure that the contractor has captured all of the requirements and accurately provided cost and schedule data that the government needs to evaluate the RFP.

LL_735: Conduct an assessment of key technologies before releasing an RFP and provide the information to offerors to assist with proposal preparation.

Background

Before the program start and as a result of the cancellation of a previous program, the deputy chief of staff G-3/5/7 requested that the assistant secretary of the Army for acquisition, logistics and technology conduct an assessment of the technologies available to meet program requirements. Funding from the cancelled program was used to fund a comprehensive and thorough government assessment of those technologies. The government

team provided the final assessment of technologies to potential offerors before the release of the RFP.

This reduced the amount of time required for RFP preparation and also reduced the time for the contractor to prepare the proposal by approximately 45 days, which consequently reduced program risk in meeting the schedule. The assessment provided offerors an awareness of desired features, as well as concerns associated with various technology options. As a result, the offerors were better able to weigh trade-offs and eliminate options that could limit mission effectiveness. Providing detailed information before the release of the RFP resulted in more detailed proposals, better engineering design choices and award of the best value contract.

Recommendation

The government should conduct an assessment of key technologies before releasing an RFP and provide the information to offerors to assist with proposal preparation. Funding should be made available to conduct this type of analysis before program initiation. A government-conducted review of technologies available to meet an emerging requirement provides several benefits: the assessment informs the requirement; it provides information to offerors responding to the RFP, allowing them to prepare quality proposals in a shorter timeframe; and the information gleaned from the assessment reduces the government's technical and schedule risk.



TESTING, ONE, TWO ...

During a proof-of-principle drill, Army Field Support Battalion – Afghanistan's Logistics Task Force Bagram ensured that subject-matter experts were on hand to answer any questions about equipment and remediate any issues with the equipment being issued. This drill was conducted to test the battalion's plans and procedures to rapidly issue an infantry company equipment set upon order from U.S. Forces Afghanistan. Similarly, when program offices look for ways to reduce costs in accordance with BBP, feedback from users and other stakeholders can help refine requirements. (Photo by Patrick A. LeBlanc)

ENSURE REALISTIC AND RELEVANT REQUIREMENTS

LL_380: Program requirements must take into account affordability and the mission of the system. The requirements document must be tailored to the purpose of system.

Background

One program began originally under the Future Combat Systems (FCS) program, whose system-of-systems concept had planned for all systems to meet very similar requirements, ensuring that a brigade combat team could operate in many different environments. This led to reduced flexibility in tailoring the system to meet mission needs while remaining affordable. The program management team disagreed often with government stakeholders and the contractor over requirements that were not relevant to the program or would result in an unaffordable system. The program had multiple requirements that were either inappropriate or unobtainable, such as the requirement to operate in temperatures as low as -25 degrees Fahrenheit without special kits and procedures. The user community and FCS program office had little understanding of the limits of the system's technology and the additional equipment it would need to meet certain requirements, which would increase the weight and cost of the system.

Recommendation

The program office and user community must resolve requirements early and often as soon as information, knowledge, test results and data become available. The program office must refine cost data as more information becomes known. It is imperative that the program office and user community be open

to trades between cost and performance as information is presented. When the program reaches a point where improvements to technology or affordability are no longer achievable, the program office and user community must work together without delay to make decisions on the program's requirements. Trying to meet requirements that do not add value will increase program costs, and trying to balance requirements that must be met with those that have marginal value will affect overall system performance.

LL_883: Question unclear or unnecessary requirements, even in approved documents.

Background

During the development of the systems engineering plan and requirements traceability matrix for a joint program, one service's requirement for mean time between operational mission failure (MTBOMF) for a system component was significantly higher than other services' MTBOMF requirements. It is difficult and very costly to test the higher MTBOMF, and it was not clear why there was a large difference in the requirement. When the other services raised this question to that service, they reviewed the requirement and agreed to significantly reduce the MTBOMF. The requirements developer updated the approved CDD with this change and documented the rationale based on the current system's MTBOMF and expected improvements in the newer system.

Recommendation

Program offices should always look for ways to reduce costs in accordance with the BBP approach, while still providing a

system in which warfighters can have confidence. Lowering unnecessarily high requirements thresholds allows for shorter test events and reduced test costs.

LL_123: Additional scrutiny is warranted when evaluating the key performance parameters (KPPs) during CDD and CPD development to make sure they translate into a relevant operational capability.

Background

One Army program found that although a system met all KPPs in the CPD, the capability was not good enough to foster confidence and applicability in an operational environment with Soldier operators. The technical specifications for the program did not translate into a capability that would be effective on today's battlefield.

Recommendation

The program office should take every opportunity to challenge requirements to ensure that resources are wisely executed and Soldiers are not burdened with a piece of equipment that does not work as intended. Challenge the requirements document from the initial development, and provide for streamlined modification of requirements, including KPPs, to ensure that the appropriate capability is delivered in a timely manner. Configuration steering boards are an effective means of getting authorization for requirements changes, but changes may be made more efficiently when conducted at the colonel level than at the general officer level.

CONTROLLING REQUIREMENTS CREEP

LL_213: Be sure to include contract language that disincentivizes requirements and contract-scope growth.



SHOP TALK

Contractors with Raytheon Inc. attach a Multiple Integrated Laser Engagement System to an M2 Bradley Fighting Vehicle during exercise Combined Resolve III at the Joint Multinational Readiness Center in Hohenfels, Germany, in October 2014. Joint integration isn't necessarily just about making sure that systems work together, but also that services work together. (U.S. Army photo by SGT Ian Schell, Viper Combat Camera Team)

Background

Requirements growth, as well as growth in contract scope that does not include the addition of formal requirements, has been a problem for many DOD programs.

Recommendation

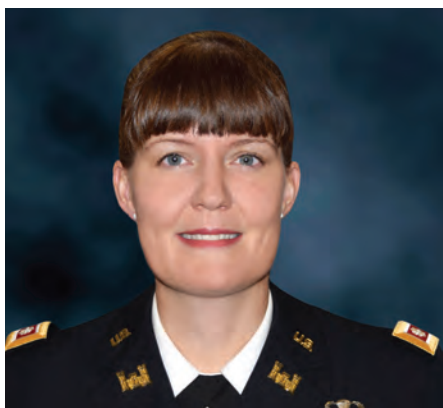
Award fees must disincentivize unilateral interpretation of requirements by the contractor and incentivize the contractor to accept changes to requirements and contract scope only via formal correspondence. For example, the following contract language could be used: "Contractor ensures that all resource needs are met. No changes in scope occur without formal contractual direction from the procuring contracting officer. All potential scope changes are assessed via formalized configuration control management processes. All scope changes

having a cost, schedule or performance impact will be approved by the government product manager. Contractor exercises sound judgment in resisting disruptive tasking."

For more information on these and other Army Lessons Learned within the ALLP, go to <https://allp.amsaa.army.mil>.

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SPOTLIGHT:

COL MOLLIE PEARSON

A lot to manage

COL MOLLIE PEARSON

COMMAND/ORGANIZATION:

Power Projection Enablers, Program Executive Office for Enterprise Information Systems

TITLE:

Product Manager

ACQUISITION CAREER FIELD:

51A (Program Management)

YEARS OF SERVICE IN WORKFORCE: 12

YEARS OF MILITARY SERVICE: 21

EDUCATION:

M.A. in human resources management, George Washington University; M.S. in information management, Webster University; B.A. in psychology, Pennsylvania State University

DAWIA CERTIFICATIONS:

Level III certified in program management

AWARDS:

Federal 100 Award; Meritorious Service Medal (five Oak Leaf Clusters (OLCs)); Army Commendation Medal (2 OLCs); Army Achievement Medal (1 OLC); Outstanding Volunteer Service Medal; Air Assault and Parachutist badges

In today’s environment of doing more with less, we’re all pretty busy. COL Mollie Pearson is no exception. As product manager for Power Projection Enablers (P2E) in the Program Executive Office for Enterprise Information Systems (PEO EIS), she manages a team of nearly 120 people spread across four continents and a handful of time zones. Her keys doing that successfully? transparency and flexibility.

P2E is headquartered at Fort Belvoir, VA, with forward offices in Korea, Hawaii, Europe and Kuwait. “It’s not possible to meet with the entire team at the same time as there is no reasonable time of the day we all can meet; and it’s not possible to quickly meet with stakeholders as they are located at least six hours away via a plane trip across the ocean,” said Pearson. “To overcome this, the job requires a dedicated workforce willing to work extended or odd hours at times; frequent travel to our forward offices; staggered work schedules; lots of teleconferences and video teleconferences; and a 24-hour operations cell to address issues as soon as they surface. I also express to my team the importance of over-communicating to ensure we are as transparent as possible with each other as well as our customer.”

Pearson first joined the Army more than 20 years ago, through the ROTC program at Pennsylvania State University. “Coming from a small town in western New York and a family of educators and service members, I knew I wanted to be a part of something bigger than myself, as they were, and I found that through my Army career.” She didn’t envision a long-term career, she noted.

“As time went on, though, I found the Army enabled me to be a part of something unlike anything else I ever experienced. I learned that through the Army, the people you meet, the experiences you have and the lessons you learn become a part of who you are.”

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

I’m a product manager in PEO EIS, and I proudly lead the P2E team. P2E, partnering with industry and our stakeholders, provides communication products and services to those who serve outside the continental United States (OCONUS). We enable our Soldiers, DA civilians and government support contractors to communicate, share and act upon information anytime, anywhere. Examples of this include supporting the



ATTENTION, PLEASE

Then-LTC Pearson addresses the staff of P2E during an all-hands meeting in 2013 at Fort Belvoir, VA. (Photo courtesy of P2E)

strategic alliance between the Republic of Korea and the United States by enabling the move of more than 20,000 Soldiers to Camp Humphreys as part of the Yongsan Relocation Plan/Land Partnership Plan (YRP/LPP); modernizing OCONUS command centers with state-of-the-art video teleconference, voice and data capabilities; and providing warfighters in Afghanistan and Kuwait the ability to access, process and act on information 24 hours a day, despite complex working environments and austere conditions.

How did you become part of the AL&T Workforce, and why?

I was attracted to the Army Acquisition Corps (AAC) because it provided opportunities for me to help Soldiers get what they need to do their job and enhance capabilities towards mission success. After serving as a platoon leader and company commander, I learned how very important it is that our Soldiers are resourced properly to accomplish their mission. We've all been in situations where we did not have the tools, equipment or capability required to do our jobs. It reduces readiness and morale. After learning the Army had an organization that could affect that, I signed up and have never regretted it.

What do you see as the most important points in your career with the Army AL&T Workforce, and why?

I've been provided and continue to have available outstanding educational opportunities including advanced civil schooling and various types of training. However, I've found that the experience I've gained across different types of jobs and organizations as well as mentorship from outstanding leaders and wise individuals I've worked with throughout my career has been invaluable. The varied lessons I learned as a tester, combat developer and assistant

product manager (APM) truly helped prepare me for my current position. It's impossible to succeed in the acquisition world without formal education; however, I've found that experience and relationships matter the most. I've been very blessed with the opportunities I've been provided and am very thankful.

What's the greatest satisfaction you have in being a part of the AL&T Workforce?

My greatest satisfaction is witnessing Soldiers using capabilities my team has provided them. It reaffirms all the hard work done by the team to deliver the capability, and makes me feel like I've truly made a difference in someone's professional life.

Acquisition is a very broad term encompassing a lot of different job specialties, with many career tools available to them. What advice would you give to someone who wants to get where you are today?

I recently advised a junior but very promising and smart APM on my team to be sure he takes time to manage his career and deliberately seek out the many educational opportunities the AAC offers. You can't succeed without the training. However, advancing in this career field requires much more than technical expertise. It takes learning an art that is developed over time via experience in various facets of acquisition in different organizations under different leaders, being humble and willing to learn from others no matter what your position, being cognizant of the strengths of others and putting them in positions to capitalize on their strengths, building a strong team you can depend on, being passionate about what you do, and seeking out mentors who are willing to take time to counsel you.

What's something that most people don't know about your job? What surprises outsiders most when you tell them about your job?

Many are surprised to learn about the scope of the P2E's mission. Many don't understand that P2E is responsible for modernizing and installing infrastructure and network services to all OCONUS stakeholders. They are also surprised about the complexities of the mission, including conducting work in austere environments; the challenges inherent in the European Installation Consolidation effort; and the magnitude of the YRP/LPP in Korea, which implements network and communication services in more than 600 new facilities at Camp Humphreys.

—MS. SUSAN L. FOLLETT



MAKING THE DROP

UH-60 Black Hawks from the 1st Armored Division Combat Aviation Brigade prepare to drop off infantrymen during an air assault raid simulation as part of Exercise Iron Focus, held March 26 at Fort Bliss, TX. A logistics engineering program first piloted with the Black Hawk Program Office in 2009 now includes the Chinook, Lakota and Apache helicopter programs. (U.S. Army photo by SPC Maricris C. Cosejo)



ENGINEERING LOGISTICS

By cutting out the middleman and putting engineers next to logisticians, AMRDEC looks to save money, keep warfighters' equipment in good repair for longer and make more strategic fix-or-buy decisions.

by Ms. Carlotta Maneice

In 2008, the U.S. Army Aviation and Missile Research, Development and Engineering Center's (AMRDEC) Engineering Directorate participated in a study with the U.S. Army Aviation and Missile Command (AMCOM) and the Program Executive Offices (PEOs) for Aviation and Missiles and Space to identify ways to help give the warfighter the most reliable, sustainable and affordable weapon systems. One initiative resulting from this study was the AMRDEC Logistics Engineering Team in 2009. Logistics engineering is the intersection of sustainment, logistics and engineering, and our team subscribes to the definition created by the Council of Logistics Engineering Professionals, which says, in part, that logistics engineering "is the professional engineering discipline responsible for the integration of support considerations in the design and development; test and evaluation; production and/or construction; operation; maintenance; and the ultimate disposal/recycling of systems and equipment."

The idea behind the team was to close the gap between the logistics and engineering communities by working within the project offices and reporting directly to the product support manager. Ronnie Chronister, formerly with the engineering directorate and the former deputy to the AMCOM commander, began a precursor to the logistics



THE BENEFITS OF TEAMING

A technician performs a system check in the cockpit of a UH-72A Lakota at the Redstone Army Airfield in Huntsville, AL, in March. The logistics engineering program demonstrated that pairing an engineer with the logistics team improved the integration of the engineering and logistics capabilities and helped Soldiers execute their mission more effectively. (Photo by Joseph Carmichael)

engineering project in 2003 after identifying the need to purchase numerous, costly aviation replacement parts.

“Ken Dulaney, former chief of the AMCOM Industrial Operations Division, and I discussed getting our engineers to better analyze the costs of the replacement parts and determine what solution we could provide to the item managers while reducing the cost to the taxpayer,” Chronister said.

Dulaney, Chronister and others met with AMCOM, the PEOs and AMRDEC to discuss the idea of using logistics engineering to solve similar issues with other organizations prior to the start of operations in Afghanistan and Iraq but encountered cultural challenges within the functions of logistics and engineering. The two disciplines were organizationally stovepiped, he explained, with little interaction between the two. Each organization had a different culture and a “this is the way we have always done things” mentality. Operations Iraqi Freedom and Enduring Freedom and the high cost of aviation sustainment forced the two to come together, but the cultures clashed. “The cultures were very strong and change was difficult,” Chronister

added. “But if you really want to do good things for the Army and our Soldiers, you have to be adaptable and you have to be open to change.”

PILOT PROGRAM TAKES OFF

After five years of discussions and meetings, a formal working group was established in 2008 to develop the approach that culminated in a pilot program with the UH-60 Black Hawk program office.

“Data, people and leadership were the keys in getting the pilot program off the ground,” Chronister said. The team had to identify what was being replaced at what interval and at what cost to perform the proper return-on-investment analysis to determine if it was more economical to continue to buy as-is or invest in redesign, he explained. “And everyone had to be comfortable enough to understand we were a team trying to save the Army money and get a better product for our Soldiers.”

“The initial response from our weapon system team members and logisticians was ‘I don’t need a logistics engineer,’ ” said



COOLING SPENDING

A machinist at Fort Hood, TX, performs a cold spray repair of an Apache helicopter mast base support. The use of cold spraying, implemented through a logistics engineering program, has helped the UH-60 Black Hawk program reduce repair times and sustainment costs. (Photo by Vic Champagne, U.S. Army Research Laboratory)

“The logistics engineer’s ability to help improve readiness and provide efficient solutions to issues that arise in the field offset any cost of having them on staff.”

John Jensen, director of the AMCOM Aviation Directorate. “Educating the logisticians on the benefits of having logistics engineers co-located with them was the key.” They were resistant partially because of normal friction between engineers and logisticians, as well as a lack of understanding of how a logistics engineer can help get the job done, he said.

“Before the pilot program, program engineers and logisticians didn’t speak the same way,” noted Jensen. “If we are talking about a servo cylinder, for example, a logistician may discuss the supply chain aspects of the item—the lead time to buy it, who makes it, how much it costs, for example. An engineer may talk about the technical aspects, such as the pounds per square inch or dimension,” he explained. “Today, logistics engineers are able to

work side by side with our logisticians, and this bridges the communication gap between the two groups.”

The Army and the warfighter are reaping those benefits, which include lower costs, faster turnaround times and greater efficiency. AMRDEC logistics engineers use their expertise and knowledge of engineering to interpret the logistics requirements for the engineering community. They work with engineers in the technical management offices and many of the other Engineering Directorate’s specialty areas to address logistics issues related to testing, sustainment, improvement, design, development and acquisition. They assist in weapon system design and sustainment efforts to reduce the logistics footprint, increase readiness, reduce the maintenance burden and



EVALUATING THE OPTIONS

A repair technician completes the wiring on the UH-72A Lakota helicopter as part of the Wide Area Augmentation System upgrade at the Redstone Army Airfield in Huntsville, AL, in March. Logistics engineers can minimize the sustainment burden by analyzing support structures for each system design and selecting those that reduce manpower requirements and use existing tools and facilities. (Photo by Joseph Carmichael)

"If you really want to do good things for the Army and our Soldiers, you have to be adaptable and you have to be open to change."

improve supply chain performance. They also introduce best practices to improve logistics efficiency and reduce total ownership cost.

WHO PAYS?

One major challenge of the logistics engineering pilot program was funding. "Even though logistics engineers and the logistics engineering program pay for themselves almost instantaneously, determining who funds them is always a big challenge," said Keith Roberson, former deputy project manager for Utility Helicopters. "The logistics engineer's ability to help improve readiness and provide efficient solutions to issues that arise in the field offset any cost of having them on staff," added Roberson, who is now director of the AMCOM Logistics Center.

Today, the Utility Helicopter Program continues to see the financial benefit of adding logistics engineers. "We had a logistics engineer with a statistical background who used his knowledge to develop an automated data analysis tool for our logisticians," said Marsha Bailey, director of the AMCOM Logistics Center's Utility Helicopter Directorate. "This is just one of the benefits of having logistics engineers work side by side with us. They know the engineering side and they can apply their expertise to the needs of the logistician."

In addition to working with the logisticians to identify problems, logistics engineers must be able to work with the systems engineering team to identify how their design decisions impact a system's life-cycle sustainment costs. Logistics

engineers work to reduce the sustainment burden by analyzing support structures for each system design and selecting those that emphasize reduced manpower requirements, modularity, reliability and use of existing tools and facilities.

Good communication skills are also vital for logistics engineers to validate a process into products or systems. “Logisticians and engineers are not wired the same way,” Chronister said. “Logistics engineers have to be good communicators and be that consensus builder with their people skills and credibility.”

RECENT SUCCESSES

The program has generated a number of cost-effective solutions. For example, the Black Hawk Project Office found that having an engineer working with their logistics team improved the integration of the engineering and logistics capabilities and helped them better execute their mission.

Recently the logistics engineering team provided a break-even analysis on the UH-60 main rotor hub. The issue was whether purchasing new rotor hubs was more cost-effective than overhauling the existing obsolete ones. The team compared the life-cycle costs, and determined it would be more expensive in the immediate future to buy new hubs. After five years, however, the model indicated that the cost of buying new hubs would break even with the cost of overhauling the obsolete hubs. After 12 years, overhauling the obsolete hubs proved to be \$11.51 million more costly.

Logistics engineers have also helped the UH-60 program reduce sustainment costs through the implementation of new technologies, including cold spray, a method of suspending metals or other materials in gas, then spraying the gas

on damaged machine parts at supersonic speeds, reducing repair times.

The UH-60 logistics engineering team lead chaired an integrated product team (IPT) to transition new cold spray repair technology to aviation components. A transmission sump pan, a component of the gearbox housing, was chosen from the salvage yard as the test component. The team sprayed, tested and qualified the pan with an immediate cost avoidance of roughly \$17,000. The sump pan would have been disposed of if not for the work of the IPT.

The fallout rate for the transmission sump alone is roughly four per year, which translates to a cost avoidance of about \$68,000 annually with the cold spray technology. The repair techniques identified in this test will be applied in the future to components experiencing similar damage and, if applied to the other gearbox housing components, this technology could achieve a savings of \$3.5 million. Earlier this year, AMRDEC’s Fernando “Rios” Merritt, the Black Hawk logistics engineering team lead, won a Defense Manufacturing Technology Achievement Award for his work to integrate cold spray technology into Army systems.

STEADY GROWTH SUPPORTING SOLDIERS

Since its inception, the logistics engineering program has grown steadily, from two engineers supporting the Black Hawk program in 2009 to 19 engineers supporting 12 organizations today, including the Chinook, Lakota and Apache helicopter programs, close combat weapon systems and unmanned aircraft systems. “Much of the success goes to the first two logistics engineers, Merritt and Chad Reeves, and the immediate impact they made in the first pilot of this capability in the Black Hawk Project Office,” said

Lou Sciaroni, AMRDEC Logistics Engineering Branch Chief. “However, each of the successive team members has continued this line of excellence and through their efforts has helped the team evolve to where it is today.”

“The logistics engineering program here at AMRDEC is unique because we are supporting the warfighter in a very real way,” said Merritt. “A lot of times you don’t see the fruits of your labor, but when technical solutions are made on behalf of the Soldier, you know your team has a direct impact on whether that Soldier has everything he or she needs to continue and complete their mission.”

CONCLUSION

AMRDEC logistics engineers help reduce life-cycle costs, enhance operational capability and optimize support infrastructure through their impact on design and logistics efforts. Their knowledge helps technicians, logisticians and other engineers to take advantage of new capabilities and incorporate them into their processes.

“The program is growing, and AMRDEC logistics engineers will continue to impact the life-cycle costs of Army weapon systems, and ultimately the warfighter, through their engineering efforts and their focus on improving supportability,” said Sciaroni.

For more information, go to <http://www.amrdec.army.mil/AMRDEC/>.

MS. CARLOTTA MANEICE is a program analyst for Intuitive Research and Technology and provides program support for AMRDEC Public Affairs. She has an MBA and a B.A. in communication from the University of Mary Hardin-Baylor.



ON YOUR MARKS

Soldiers from the 1st Battalion, 68th Armor Regiment, 3rd Armored Brigade Combat Team, 4th Infantry Division set up communication equipment during Decisive Action Rotation 15-02 at the National Training Center (NTC) at Fort Irwin, CA, in November 2014. The goal of the AERWG mirrors that of the NTC session: to ensure that Soldiers are responsive and consistently ready for the current fight and unforeseen future contingencies. (U.S. Army photo by SGT Charles Probst)





‘SOLDIER, WHAT CAN EARWIG DO FOR YOU?’

A semiannual, Armywide series of meetings known as AERWG, developed in the early phases of the wars in Afghanistan and Iraq, is helping the Army adapt and evolve its force equipping methodology in the face of a changing world and austere budgets.

by MG Robert M. “Bo” Dyess Jr. and Mr. David N. Lakin

It’s pronounced “earwig,” like the bug, but if you’re a Soldier downrange, this earwig—AERWG, or the Army Equipping Reuse Working Group—can make the difference between having and not having the right equipment, at the right time, to accomplish your mission.

AERWG is a semiannual, Armywide series of meetings held over three days where force managers, equippers and operators discuss and resolve the Army’s most pressing equipping issues. Hosted by Headquarters DA (HQDA) G-8, the Army Materiel Command (AMC) and the Army Sustainment Command, AERWG provides opportunities for communication and coordination between senior leaders, action officers and top equippers.

Representatives from Army commands (ACOMs); Army service component commands (ASCCs); direct reporting units (DRUs) and reserve components, including the Army equipping enterprise community; force development “hardware” divisions, G-3/5/7; Forces Command; and the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)) attend to identify the equipment needs from big formations to Soldiers and the squad.

Besides the name, what also makes these meetings unique is that AERWG participants review equipment distribution plans for the next two years; “scrub” modified tables of organization and equipment (MTOEs); and scrutinize systemic “friction-generating” issues through special topic sessions at the strategic level for resolution. (An MTOE is the document

that authorizes the unit to have the personnel and equipment necessary to accomplish its mission.)

SYNCHRONIZE AND DELIVER

AERWG is about readiness: providing our Soldiers and squads the tools they need to accomplish their mission, whether it's for training or combat. Ensuring that Soldiers have the nation's best equipment to get the job done is the top priority of G-8.

In 2004, the operational tempo in Iraq and Afghanistan was evolving faster than the Army's institutional systems could adapt, so G-8 held the first Army equipping conference with major stakeholders attending from ACOMSs, ASCCs, DRUs, HQDA staff, the ASA(ALT) and program executive offices. It soon evolved into a semiannual meeting, with an expanded list of participants to synchronize all emerging operational requirements and apportion the Army's equipment.

AERWG is a three-part operation. AMC leads the equipping distribution sessions to synchronize the allotment of equipment with emerging needs, to build readiness, so that missions, either training or combat, can be successfully completed. AMC's job, in coordination with ASA(ALT)'s program managers, is to distribute and field equipment, while G-8 is responsible for programming the resources to procure the equipment.

During the draft MTOE equipment review sessions, AERWG participants match up the timelines of the Army's operational priorities up to 24 months out with the equipment a unit is scheduled to receive.

“We've found the best way to ensure equipment readiness for the Soldier and squad is to plan about two years into the future, to get ahead of any equipping problems that might come up,” said COL

Brian Halloran, chief of the G-8 Force Development Plans, Strategy and Policy Division. “We scrub a unit's operational needs, the Army's operational priorities and the timelines, to make sure they are all linked. If we all have the same view, we can be more flexible, make changes together and adapt. We know there will be changes, so having this forum twice a year provides an opportunity to stay synchronized with the operating needs of our Army.”

The special topics discussion during the final session tackles issues at the strategic level across the Army that impact specific equipping problems, such as divestiture policy and materiel management, that could stand in the way of equipment readiness.

“Without AERWG we would not have the right equipment, the right quantities or the right type, to the right units in the right amount of time,” said MG Daniel L. Karbler, FD director of Joint and Integration. “Our job is to coordinate and integrate across all the players in the Army equipping enterprise to get Soldiers their gear on time with the right level of training to support their mission.”

Through his Operational Integration Division, led by COL Steven E. Brewer, Karbler accomplishes this task and tracks equipment on-hand readiness across the ACOMS and ASCCs to ensure units have adequate types and quantities for deployment and redeployment.

“If there was no AERWG, our effort to get Soldiers the equipment they need to meet the Army's operational priorities would be piecemealed, instead of having the whole weight of the institutional and operational Army working together,” he said. “We want to streamline processes and save money on transportation costs



OPENING DAY

COL William M. Krahlng, Army Sustainment Command; MG Robert M. “Bo” Dyess Jr., director of Force Development, G-8; and BG Daniel L. Karbler, director of Joint and Integration, G-8, discuss proceedings at an AERWG opening session. The semiannual meetings began in 2004, to ensure that Soldiers were properly equipped for the ramped-up operational tempo in Iraq and Afghanistan. (Photo by Marla Hurtado)



LESS MOVEMENT, MORE SAVINGS

Trucks carrying equipment from the 25th Infantry Division enter Warrior Base, New Mexico Range, Republic of Korea, on March 6, as part of a convoy transporting equipment for joint training exercise Fowl Eagle 2015. AERWG aims to streamline processes and save money on transportation costs by minimizing the movement of equipment. (Photo by SPC Steven Hitchcock)

by moving equipment only once to a location. The most effective way to move equipment and build readiness is to minimize the movement of equipment.”

MAKING DO WITH LESS

According to the “The U.S. Army Operating Concept: Win in a Complex World 2020-2040,” because of “reduced budgets, joint and Army forces may not have ready forces in sufficient scale to respond to and resolve crises.”

Recent budget constraints have caused the Army to extend procurement timelines. For example, the Army’s Joint Light Tactical Vehicle program has a planned procurement of 20 years. This dilemma increases the importance of prioritizing missions and matching a unit with specific equipment. A unit must have on hand certain equipment for training at a home station, at a combat training center and down-range, or receive it in theater to execute a mission.

Less money and less equipment makes the AERWG process more critical now, by providing a forum to share a common operating

picture of where the Army is headed for building equipment readiness for Soldiers and squad, now and into the future.

CONCLUSION

The Army has used the Army Force Generation system for sustaining combat operations in two theaters over an extended period, but is introducing a new system, the sustainable readiness model (SRM). SRM will continue to use rotational forces to meet the majority of combatant commanders’ requirements for planned and contingency operations, and sustain readiness for emerging missions.

AERWG and SRM provide senior leaders with an opportunity to plan up to two to three years in advance for the new equipment their units will require for training and combat, by synchronizing units, missions and equipment requirements. The challenge comes when ASCCs deploy and redeploy and the resulting changes in their unit’s structure impact the equipment they will need. AERWG tries to minimize any friction points between equipment priorities and equipment readiness.



SUPPORTING SUSTAINMENT

Army Reserve, National Guard and active duty Soldiers load shipping containers during Operation Patriot Bandoleer at Military Ocean Terminal Sunny Point near Southport, NC, on March 17. A collaboration between AMC, ASC, the Army Surface Deployment and Distribution Command and the National Guard Bureau, the operation creates a process for National Guard units to participate in real-world sustainment missions. (U.S. Army National Guard Photo by SFC Robert Jordan)

During the last 15 years it was the Army’s policy to frequently ‘equip, train and man.’ The Army wants to move to a model that mans the unit and then equips it, providing the commander an opportunity to train the unit and determine how ready his Soldiers are to accomplish their mission. We need to ensure that no Soldier, whether active duty, Army National Guard or U.S. Army Reserve, goes downrange without the right equipment. The AERWG will continue to support this critical goal by addressing the concerns of the equipping stakeholders throughout our Army.

For more information, contact the Division Chief of the Plans, Strategy and Policy Division, Force Development, G-8, HQDA, at 703-692-4945.

MG ROBERT M. “BO” DYESS JR. is the director of force development, HQDA G-8. Previously he served as director of the

Requirements Integration Directorate, Army Capabilities Integration Center and as division chief, Force Integration, Combined Security Assistance Command – Afghanistan during Operation Enduring Freedom. He holds an M.S. in systems engineering from the Virginia Polytechnic Institute and State University and an M.S. in strategic studies from The Air University. He was commissioned as an infantry second lieutenant from the United States Military Academy at West Point in 1982, where he earned a B.S.

MR. DAVID N. LAKIN is an analyst with the Plans, Strategy and Policy Division in the Force Development Directorate, HQDA G-8. He has held a wide variety of public affairs positions in the private and public sectors, including public affairs officer for U.S. Forces – Afghanistan from January 2011 to July 2013. He holds an M.A. in journalism from the University of Oklahoma and a B.A. in political science from Coe College.



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COMMAND/ORGANIZATION:

Cruise Missile Defense Systems Project Office, Program Executive Office for Missiles and Space

TITLE:

Chief systems engineer and director, systems engineering and integration

ACQUISITION CAREER FIELD:

Systems planning, research, development and engineering, Career Program 16

YEARS OF SERVICE IN WORKFORCE: 21**EDUCATION:**

M.S.E., aerospace engineering, University of Alabama in Huntsville; B.S. in computer science and B.S. in physics, Henderson State University

DAWIA CERTIFICATIONS:

Level III certified in engineering

AWARDS:

Ancient Order of Saint Barbara; Honorable Order of Saint Barbara; Achievement Medal for Civilian Service (for support to the PEO for Air, Space and Missile Defense); Achievement Medal for Civilian Service (for support to Operations Iraqi Freedom and Enduring Freedom); U.S. Army Aviation and Missile Research, Development and Engineering Center Executive Director Commendation; Office of the Secretary of Defense Excellence Award; and Joint Meritorious Unit Award

By his own estimation, Patrick Duggan has changed jobs every three to six years in the three decades he's been part of Army acquisition. "Sometimes I apply for them, and sometimes it's a matter of someone asking me to join their team to help solve a problem," he explained. But while his title may change fairly often, his desire to serve the warfighter hasn't wavered.

That desire first brought him to Army Acquisition in the mid-1990s. "I didn't have a preconceived idea about where this path would take me. I only knew that I wanted to be involved in delivering capability to our Soldiers and to improve myself so that I would have opportunities for greater contribution and impact," said Duggan, director of systems engineering and integration and chief systems engineer for the Cruise Missile Defense Systems (CMDS) Project Office in the Program Executive Office for Missiles and Space (PEO MS). (Duggan's home organization is the U.S. Army Research, Development and Engineering Command at its Aviation and Missile Research, Development and Engineering Center; he is assigned to PEO MS under a memorandum of agreement between the two organizations.)

With almost 31 years of government service under his belt, Duggan isn't looking to retire any time soon. "I like federal service and the opportunity to make a difference. I'm having fun, and I'll stay for as long as that continues."

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

I serve as chief systems engineer for the CMDS Project Office in PEO MS. My responsibilities include systems and software engineering, software quality and information assurance for five programs: Indirect Fire Protection Capability Increment 2 – Interceptor, Sentinel, Stinger, Avenger and Joint Land Attack Elevated Network Sensor. I supervise 40 to 50 government engineers and support contractors.

How did you become part of the AL&T Workforce, and why?

I had the opportunity to apply to the acquisition workforce in 1994 as DOD was implementing acquisition reform and complying with the Defense Acquisition Workforce Improvement Act. I saw the acquisition workforce as an opportunity to receive the training and leadership needed to be part of successful teams that develop and field capability to the warfighter.



GROUP FORMATION

Patrick Duggan, center, poses with systems engineering, software engineering and information assurance personnel from the CDMS Project Office at PEO MS. (Photo courtesy of PEO MS)

What do you see as the most important points in your career with the Army AL&T Workforce, and why?

I've had great opportunities as a member of the acquisition workforce. Whether these opportunities involved fielding a capability, a defense acquisition board (DAB) decision or a canceled program, there was always benefit the warfighter. Looking back, I can see a handful of activities that were particularly helpful in that aspect.

Mentors were very important to me. They taught me high standards for excellence and technical competence, which have helped me contribute to successful teams and are something of value that I can pass along to others.

Very early in my career, I was responsible for conducting a deployment and siting study for national missile defense, under the oversight of the ADA [air defense artillery] combat developer and the Space and Missile Defense Command's commanding general.

The best year of my professional and personal life was during a one-year developmental assignment working for the deputy director for missile warfare under [the Office of] Strategic and Tactical Systems at the Office of the Undersecretary of Defense for Acquisition, Technology and Logistics. I was routinely entrusted with

actions that impacted acquisition and policy decisions, which was sometimes very intimidating. At the time, I was a GS-14 and very junior compared to the professionals I worked with and for. I learned a great deal about how the programming, planning and budgeting system really works, based on processes, policy and statutory requirements. I staffed and attended DABs for three ACAT [acquisition category] 1D programs at the pre-MDAP [major defense acquisition program] stage; served as one of the primary DOD individuals responsible for the Medium Extended Air Defense System pre-MDAP program; and helped organize and implement DOD's management approach for joint air and missile defense.

In 2004, the PEO for Air, Space and Missile Defense [one of two PEOs that merged to form PEO MS in 2005] asked me to help stand up a new product office for what is now called the IAMD Battle Command System. I spent five-plus years as deputy product manager of this product, which will modernize and advance integrated command and control capabilities across air and missile defense forces.

Is there a program or opportunity you wish you had pursued but didn't?

I turned away a GS-15 promotion opportunity in the late 1990s and an opportunity in early 2000 to serve as the technical

director and chief engineer for a major program. My path would have been very different if I had taken those opportunities, but I like to think the path I chose was of greater service—and also a path of being involved in some amazing things that helped the warfighter, things I would never have the opportunity to do if I had taken the other roles. I have no regrets.

What's the greatest satisfaction you have in being a part of the AL&T Workforce?

Being part of successful teams that field capability to our Soldiers.

Acquisition is a very broad term encompassing a lot of different job specialties, with many career tools available to them. What advice would you give to someone who wants to get where you are today?

Strive to improve yourself, always, personally and professionally. Seek developmental opportunities and practice excellence. Dedicate yourself to serving the warfighter and serving others. Practice kindness to others, and look for opportunities to be generous in your deeds toward others. Desire success, but do not desire credit.

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

The technical aspects of my job are the easiest. Leadership is hard, harder than any science or engineering degree I have earned.

What surprises outsiders most when you tell them about your job?

I don't talk about my job unless asked, so I don't know what they are surprised by. As far as my contacts, friends or family, I don't think they identify me by my job or profession.

—MS. SUSAN L. FOLLETT



SOFT LANDER

The Advanced Cargo Parachute Release System, developed by Product Manager Force Sustainment Systems at Natick Soldier Systems Center, MA, should help valuable cargo loads arrive intact on the battlefield. As the Army adjusts to new and emerging strategic, operational and financial environments, those with the responsibility to equip the Soldier must adjust as well. (Photo by Rob Hawley, NSRDEC Strategic Communications)

GETTING REQUIREMENTS RIGHT

The Army delivered mission-essential and lifesaving QRCs to Soldiers during more than a dozen years at war. As a result, the Army is faced with the challenge of documenting requirements in order to transition those capabilities to programs of record. The following observations and opinions derive not just from personal experiences, but from professional discussions with peers, subordinates and leaders in TRADOC and the acquisition workforce.

by MAJ Timothy J. Bracken

Acquisition professionals are tasked to manage their program's cost, schedule and performance. In many cases, managing performance can be the most challenging. This is because the program office not only manages the specifics that determine and define their capability's requirements, but also maintains a relationship with the organization that manages and "owns" the capability's requirement documents. That organization is the U.S. Army Training and Doctrine Command (TRADOC) Capability Manager (TCM). These requirement documents, the initial capabilities document (ICD), capability development document (CDD) and the capability production document (CPD) are what define the characteristics and performance parameters of a capability or materiel solution.

Despite the best of situations, many barriers exist when developing, fielding and sustaining a capability. Even in the early phases of capability development, a plethora of events occur that require cooperation and communication between acquisition professionals and capability managers. This coordination is necessary to shepherd a document through the wickets of the Joint Capabilities Integrated Development System (JCIDS) process for it to become a program of record (POR).



‘GOLDEN’ VEHICLE

SFC Carlos Shell, liaison officer for the Capability Package Directorate, inspects a newly integrated, one-of-a-kind “golden” vehicle with Ramon Ganda, program manager, Warfighter Information Network – Tactical, at the NIE Integration Motor Pool, February 6. Not all materiel is golden: A manager needs resources to create an approved requirement for a desired capability, but resources are often unavailable without an approved requirement. (Photo by Theotis Clemons, NIE Plans)

One challenge facing project and program management offices (PMOs) is the lack of resources needed to work these early stages because the Army will not resource many activities without an approved requirement. Arguably, however, a more challenging set of circumstances has been occurring in PMOs Armywide as program and project managers (PMs) transition their offices to meet the demands of shifting priorities and resources in a budget constrained environment. For several years, the Army has been adjusting to new and emerging strategic, operational and financial environments based on changes in national security and national defense strategies.

THE PROBLEM

The wars in Iraq and Afghanistan created several operational challenges that required the Army to field Quick Reaction Capabilities (QRCs) in response to operational needs statements (ONS) and joint urgent operational need statements (JUONS). Resultantly, many Soldiers’ lives were saved and capability gaps and associated risks were significantly mitigated. The goal of these solutions was to get sufficient capability to the warfighter as quickly as possible. The logic was that the quicker the

capability was delivered, the more lives would be saved and the more success our warfighters would meet on the battlefield.

The upside to this process was that, without question, lives were saved and most missions were successful. The downside to this process is manifold, however. First and foremost, the analytical rigor and documented processes that are generally used to develop, manufacture, test, deliver and sustain materiel solutions were often not used in response to ONS and JUONS. QRCs were quickly procured from industry and sent down-range with little regard to cost, integration, testing or sustainment.

These solutions were often fielded as pilot programs without acquisition management. QRCs were funded using contingency dollars that did not include sustainment money. Resultantly, many QRCs were either left in theater, destroyed or stored away for future use. Yet Army leadership has deemed some materiel solutions to be enduring capabilities and be managed in the respective PMO. These organizations are transitioning many of these QRCs to PORs in order to secure sustainment dollars not appropriated in contingency funding.

Effective communication is one of the most important characteristics of any relationship. The development of requirements is a complex process in which concepts, technology, industry capacity and cost are extensively analyzed and documented.

As a result, PMs are responsible for creating documents and processes that would be required for a validated and funded program to proceed through the acquisition process. These products and documents must be generated so senior leaders can assess the capability and resource sustainment dollars accordingly. What drives and directs this rigorous process, from start to finish, are the requirements documented by the TCMs. The Army must have a valid need for the capability. Requirements spell out this need and must be integrated into the acquisition process.

DEFINING ‘REQUIREMENT’

Many PMOs face challenges in managing their requirements because, over the past several years, business has been conducted with a fundamentally different perspective of what exactly defines a requirement. The word alone has different meanings for different people in the acquisition workforce. In the past, when responding to an ONS, a requirement meant getting a generally defined capability to the user. General and generic system characteristics such as size, electromagnetic hardening, ruggedness and weight were not a priority or a requirement when providing a solution to the end-user.

ONS and JUONS also do not have basis of issue plans (BOIPs) or a designated military occupational specialty, which are needed for a solution to transition to an enduring or institutional capability. This means that TCMs and PMs must closely coordinate to document the BOIP and ensure the capability is delivered to units accordingly. This process is time consuming and requires significant logistic planning and effort. Furthermore, as PMOs transition to PORs, they are responsible for managing TRADOC-generated performance requirements, which are more defined with key performance parameters and key system attributes. With a capability already in the hands of the user, the transition from general to specific makes satisfying these requirements costly and difficult.

Another consequence of the ONS process is the increased risk of capability managers and document writers basing their requirement documents (in part, at least) on an existing materiel solution or capability. Much like the PM trying to catch up to the process to secure funding to sustain a capability, the TCM tries to tailor requirement documents to an existing materiel solution that once satisfied an ONS.

NEW AMMO

Kori Phillips, a project engineer with the Joint Service Small Arms Program, holds the new and lighter M249 rounds in her right hand and the current rounds in her left. The modified M249, known as the Cased Telescoped Light Machine Gun, is shown below and between her hands. Phillips' exhibit was part of a media day at Picatinny Arsenal, NJ, May 4. Getting from a current capability or solution to a future one requires LCDs, CDDs and CPDs, which define the characteristics and performance parameters of a capability or materiel solution. (Photo by David Vergun)



This technique and practice is fundamentally flawed as it puts the writer into a vacuum, isolated from the PM's input. The PM's input when documenting requirements is in fact necessary to ensure the end-product is achievable. Furthermore, stakeholders who do not understand acquisitions or the requirement validation process can sometimes have disruptive influences on the requirements documentation process. Similarly, if a materiel solution was developed under an Army functional proponent, roles and responsibilities must be realigned when the capability transitions to a POR. Any single one of these practices creates the risk of documenting requirements that are not feasible, affordable or sustainable. The resultant document thus becomes a wish list to improvements in an existing capability, not an attainable response to a validated capability requirement that

is generally derived from a documented concept and capability gap. Requirements must be traceable from validated concept through materiel development.

THE SOLUTION

Very early in professional development, Army leaders are taught how to clearly identify a problem as the first task in problem solving. Knowing the dynamics of a problem enhances a leader's ability to scope the issue, understand the risk, allocate resources, develop courses of action and execute. In providing capability to the warfighter, it is the role of leadership at the PM and TCM to identify any problems that prevent their organizations from working through requirement-related issues. It is imperative for leaders to chart the path to success from concept to end item. This is achieved through coordinated action between the TCM

and the PM by developing, delivering and sustaining a capability to the end user. This involves not just giving the warfighter something, but giving the warfighter something that is defined and associated with the problems and barriers in their current or future operating environments.

Much like an operational organization, the command climate and command philosophy have significant effects on how the members of the PM and TCM interrelate. With that, leadership at both offices must communicate openly and nurture a productive and positive relationship with action officers and document writers.

The relationship between the two organizations cannot be exclusive to leadership because very often leaders rely heavily on the experience and advice of senior capability managers and assistant PMs. These individuals have often been in the management offices since the capability was conceived and have significant influence and knowledge. The first step in establishing this cross-organization relationship is face-to-face interaction, which is imperative in any interpersonal encounter. Video teleconferences (VTC) are worthy, but a temporary duty trip to the TCM or PMO can pay huge dividends and avoid confusion, miscommunication, wasted labor and time. Simply put, leaders need to work together and "troop the line" between TCMs, PMs and stakeholders to ensure the warfighter is getting the right equipment that is operationally sustainable and on time.

Whether a program is just kicking off, bending metal, in final tests or in sustainment, the importance of effective written and verbal communication cannot be underscored enough. Effective communication is one of the most important



SAFETY FIRST

Patrick A. LeBlanc, Army Field Support Battalion-Afghanistan safety officer, right, looks on as CPT Audrey J. Dean, center, 1st Theater Sustainment Command deputy safety officer and radiation safety officer, and SFC Teng Xiong-White, 4th Resolute Support Sustainment Brigade radiation safety officer, complete paperwork that will accompany Advanced Combat Optical Gunsights, mortar scopes and other equipment that uses radioactive tritium as a constant light source as it is shipped to the Army Dosimetry Center at Redstone Arsenal, AL. In addition to performance, materiel solutions and capabilities have a spectrum of other requirements. (Photo by Summer Barkley)



REQUIREMENT: REQUIREMENTS

Vigilant Pursuit provides dedicated tactical pursuit vehicle-mounted and dismounted assets that employ cutting-edge technologies, enabling signals- and human-intelligence Soldiers to cross-tip and cross-cue timely intelligence to more rapidly and accurately identify high-value targets. Whether it's a vehicle or a cutting-edge system within it, all material solutions and capabilities in a program of record have the requirement for requirements. (Photo by Kashia Simmons)

characteristics of any relationship. The development of requirements is a complex process in which concepts, technology, industry capacity and cost are extensively analyzed and documented. This time-consuming method creates a train of thought exclusive and unique to many capability managers.

CONCLUSION

Documenting Army “needs” is no small or easy task. It takes training. There is very little room for ambiguity when describing and documenting materiel solution attributes and characteristics. This particular way of thinking and communicating creates a lexicon within the capability management community that is often a barrier for counterparts in the PMO. Leaders must identify issues like this and take measures to mitigate their effects. Online training, VTC working lunches and other knowledge-sharing exercises can reduce the effects of cultural differences between the TCM and PMO.

Many PMOs and TCMs are going through the transition from QRC to POR. This change may be tumultuous and it will

require Army professionals to adjust how they conduct business, interact and communicate with others and fulfill their role in support of the user. Ultimately, it is our job to care about the Soldiers’ problems because they do not have time to worry about ours. Effective communication leads to getting capability to the warfighter, which is everyone’s responsibility, because we never want to send our Soldiers into a fair fight.

For more information, contact timothy.j.bracken.mil@mail.mil.

MAJ TIMOTHY J. BRACKEN is an aviation branch officer and assistant program manager for Project Management Office DOD Biometrics, where he manages foreign military sales. He worked three years at the Aviation Center of Excellence in the Capability Development Integration Directorate before acceptance into the Acquisition Corps in 2013. He holds an M.A. in history from the University of North Carolina, Wilmington and a B.A. in history from the University of Tennessee at Knoxville. He is Level I certified in program management.

TECHNICALLY

IM KM WHO RU?

The fundamentals of knowledge management, fundamentally.

by Mr. James E. Neumiller II

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 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, when possible, only the 1,000 most commonly used words in the English language and the Ten Hundred Words of Science Challenge, at <http://tenhundredwordsofscience.tumblr.com/>, as a guide.

Everyone reading this has heard about information management, or IM. When they think of IM, they think about computers, networks, software and hardware. They think about e-mail, PowerPoint and Word. They think Microsoft, Adobe and Apple. And they are right. IM uses all these pieces to make, save, find and send information. But once we have information, what do we do with it? How do we put it to use? This is the key thing about knowledge management, or KM. KM is where information, joined with meaning, can be used to make key decisions. It is where more people can get more information because the information is shared to make more decisions better.

There are two kinds of knowledge. The first and most usual type is called explicit knowledge. It is the kind of information that can be read, seen, filmed, recorded and, most importantly, shared. The other is tacit knowledge, which is much harder to share. It is often personal and hidden. It is everything each of us has seen, heard, read, experienced or thought about.

Tacit, "head" knowledge exists in the mind of the owner. Sadly, easily shared explicit knowledge makes up only 20

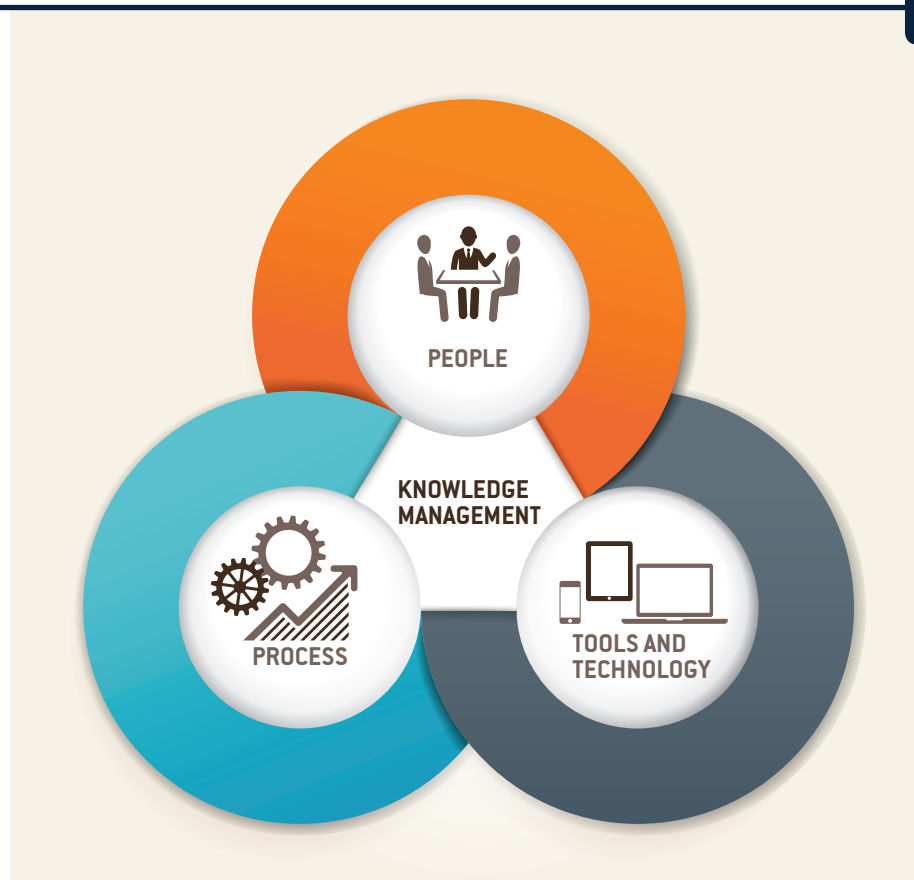
percent of total knowledge. A key reason for using KM practices is to “reveal” and share the other 80 percent. An example of “tacit knowledge” might be a writer with an idea for a blockbuster movie. While the idea remains hidden in the writer’s mind, nothing can be done with it. Once it reaches the desk of a movie producer, gets into the hands of actors and finally placed on film, the tacit knowledge shared has become explicit knowledge. The idea has much more value now that it has been shared.

Without KM, IM is like a library where you cannot read a book, watch a movie or listen to music. We know the information is there, but we cannot add any meaning to it or use it. Without IM, KM can’t share information and meaning with those people who need it to make daily decisions.

KM IN FOUR PARTS

KM has four major parts to consider. They are the PEOPLE in a GROUP, PROCESSES, or how people do things, and TOOLS and TECHNOLOGY, or the enablers people use to do things as part of a GROUP. These four parts must work together to better use not only the explicit knowledge already known, but also to help draw out the tacit knowledge known and understood by its owners.

When considering the PEOPLE part, we first have to look at our colleagues as humans. Trust is an important tool in revealing hidden knowledge. PEOPLE must feel that things they share with the GROUP will be used for the good of the GROUP. They will not trust you if you make fun of them or hurt them. If you are in a GROUP and have something to say, do you say it? If you trust the GROUP, you probably do. But if you didn’t know who might hear you or read what you wrote, you might not want to



THREE THINGS TO CONSIDER

KM has three major considerations: the people in a group, the processes they follow and the tools and technology they use. These three parts must work together to make best use of explicit knowledge and to help draw out tacit knowledge. (SOURCE: iStock/Thinkstock)

share your thoughts and words. Making people feel that they can share as part of a trusted GROUP is key to good KM. When you can trust, you can share.

The second part of knowledge management is PROCESS—the different steps to start and finish a job. Many processes have grown up over time, and, as PEOPLE, we fall in love with them. When someone tries to change the way we do things, we think they are attacking us or our GROUP. A work GROUP using good KM will understand the change not as an attack, but as a smart way to make things better for the GROUP. All ideas can come out and be tried until the best rises to the top. When this happens, change is not so scary.

The third part of KM is TOOLS and TECHNOLOGY, which are the computers, networks, software and hardware we use every day at work. Of the four parts of KM, this is probably the easiest to get right if you have thought about PEOPLE and PROCESS first.

It is important to understand that not all TOOLS include computers and networks. Conversations, meetings, signs, printed papers and books can also be TOOLS in sharing information and knowledge. Using TOOLS and TECHNOLOGY is the easy part of KM as long as we have great thinkers in our GROUP.

The last piece of KM is the idea of GROUP or organization. Within our GROUPS, the PEOPLE, the PROCESSES and the

TOOLS and TECHNOLOGY come together to complete a knowledge-sharing situation. This is where the PEOPLE feel safe to share their ideas and what they know. This is where they come together to make common decisions about how they complete their PROCESSES. This is where the GROUP will decide which TOOLS or TECHNOLOGIES they will use to get the work done. This is where leaders and managers must step in to create that type of setting.

THE IM-KM COMBINATION

We need both IM and KM to get more out of our everyday work. It is only when you bring IM and KM together that a normal GROUP can get things done

in the best possible way. The true value comes when PEOPLE learn to trust their leaders and share the explicit or hidden knowledge more openly. KM can help.

For more information, go to <http://usacac.army.mil/organizations/mccoelcdid/akm>, the website of the Army KM proponent at the U.S. Army Combined Arms Center.

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Knowledge Management Qualification Course, the Army's LEAN Six Sigma Black Belt and Master Black Belt training programs, and the Army Management Staff College Sustaining Base Leadership and Management Program. He is certified by CompTIA Security+ and is pursuing certification as a certified knowledge manager with the Knowledge Management Professional Society.

Take a shot at writing something super technical, such as a concept, technology or job, in the 1,000 most commonly used words. Send it to ArmyALT@gmail.com.



KNOWLEDGE MANAGEMENT BRIDGING THE GAP

According to the KM view of things, data is the foundation of knowledge, but it's more like the letters that make up a word. Information is data organized into words, and knowledge is words organized into sentences that convey meaning. (SOURCE: U.S. Army Combined Arms Center)



milSuite

<https://www.milsuite.mil>

milSuite, the DoD's secure enterprise social business tool, enables individuals, teams and commands to connect globally across services, rank and position to the expertise, information or ideas that matter.

Business as usual simply can't address the complexity and uncertainty of the defense environment. Information transparency is critical to collaboration. The timely discovery of new and valid knowledge empowers staffs to create innovative solutions, improve products and promote effective processes.

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milSuite is a collection of enterprise social business tools produced by the U.S. Army's Program Executive Office for Command Control Communications-Tactical MilTech Solutions office for the purpose of connecting the DOD workforce with collaboration and knowledge management tools. To get started, logon now at <https://www.milsuite.mil>.



FROM RESEARCH TO PROGRESS

Arkema's laboratory experiments lead to advances in materials design and performance such as Kynar, a high-performing, durable coating that protects many of the world's skyscrapers, and Plexiglas, perhaps Arkema's best-known product. (Photos courtesy of Arkema Inc.)

MAKING AND FINDING SOLUTIONS



Dr. Ryan Dirkx
Vice President,
Research and Development
Arkema Inc.

For chemicals manufacturer Arkema Inc., customer and regulatory requirements are opportunities for product change and improvement.

Arkema Inc., headquartered in King of Prussia, PA, may be a company that most Army AL&T readers have never heard of. But it's also likely that most readers have come in contact with the company's products, which can be found in a wide variety of industries, including building and construction, agriculture, automotive, water purification, household and industrial cleaning, dental hygiene, batteries and energy storage, and solar energy. Among those products are "chemical intermediates," substances fundamental to chemical processes, coatings or materials in coatings, and additives that enable a component to be manufactured or improve the final product's cost and performance.

Arkema might not make the sheet of glass in a window, but it very well could have made the coating on the glass that helps it keep heat inside or outside a building. The company might not make the fuel line in the family car, but might make the component that helps the fuel line meet federal regulations. It might not make the metal that covers the Petronas Towers in Kuala Lumpur, Malaysia, the tallest twin towers in the world, but it most certainly did make the Kynar coating that keeps the buildings' metal cladding colorfast and resistant to weather, sun, chemicals and pollutants.

According to the company, Arkema's business revolves around "innovation platforms" that it believes can play a role in resolving future challenges of societal importance, including access to drinking water, affordable alternative energy, energy storage and sustainability. These platforms include photovoltaics and wind, renewables, energy efficiency and water management.

We reached out to Arkema because, of all the industries out there, a major player in the heavily regulated chemical industry might offer Army AL&T readers insight



ASSESSING CAPACITIES

A technician uses a micro-extruder to evaluate small quantities of experimental polymers. Arkema’s business revolves around “innovation platforms,” including photovoltaics and wind, renewables, energy efficiency and water management. In order to ensure that it meets its customers’ requirements, Arkema maintains the knowledge and capability to formulate polymers in-house.

into the ways that industry develops its own requirements—or addresses government-mandated requirements. And the materials Arkema makes are just plain fascinating.

Probably the Arkema brand best known to the general public in the United States is Plexiglas. Another product, well-known to those in the coatings (e.g., paint), construction and building industries, is Kynar, which is an exceptionally durable, first-of-its-kind polyvinylidene fluoride (PVDF) coating that’s been around for 50 years. In fact, the venerable, trademarked Kynar is so well-known in the building industry that it is often, although wholly inaccurately, used as a synonym for PVDF coatings in general.

Plexiglas and Kynar are registered trademarks of Arkema Inc.

For Dr. Ryan Dirkx, vice president of research and development (R&D) at Arkema Inc., Kynar and other PVDF coatings are the reason “you don’t ever see anybody out repainting a skyscraper. That’s because it’s once and done. The metal is actually coated back in the factory. They bend it into the shapes they need to build the skyscraper, and it’s never painted again.”

A veteran of more than 20 years at Arkema and its predecessor companies, Dirkx is responsible for R&D activity in North America, management of the R&D Center in King of Prussia

and coordination with the global R&D activities of the parent company, Arkema, headquartered in Paris. He has directed global R&D organizations for several Arkema businesses, most recently, those within the Performance Polymers and PMMA (Altuglas) Divisions. (PMMA is poly(methyl methacrylate), more commonly known as acrylic “glass.”) He is a past chair of the Industrial Research Institute and past co-chair of the Board on Chemical Sciences and Technology, part of the National Academies.

Dirkx earned a B.S. in ceramic engineering from the New York State College of Ceramics at Alfred University and studied materials science at Pennsylvania State University, where he bypassed an



REPEATING THE PROCESS

A commercial-scale, 450-ton injection molding machine allows Arkema to duplicate the customer's processing conditions and troubleshoot problems. For Dirkx, this capability is fundamental to the success of Arkema's relationship to its customers along the supply chain.

M.S. and went straight to a Ph.D. in solid state science.

Army AL&T: A lot of our readers may not be familiar with your company, but it's quite likely that products you make are right in their neighborhoods, homes or offices. Kynar comes to mind. Can you give us some examples of Arkema products that people may not be familiar with that they might see or use every day?

Dirkx: Indeed, our products are not terribly visible unless someone points them out to you. Kynar is a good example of this. It is a high-performing paint that is used on most of the world's skyscrapers. It lasts for decades, and that's why you never see anyone painting these structures.

Some other good examples would include Plexiglas taillights, hydrogen peroxide in cleaners, detergents and oral care products, and components in the lithium ion batteries found in your cellphones and photovoltaic solar panels. We have products that are made into nutrients for chicken feed and polymers that are used under the hood of your automobile.

Most often, if you buy an Arkema product, it's going to be a component of the thing you buy. If you buy paint as a consumer, for example, there's a lot of stuff in a gallon of paint. The resin that holds it together is an important part of the final properties that you get. In addition, the paint's got a solvent, which today is largely water; it's got pigments to give you

the color; it's got opacifiers and all kinds of things to give you the gloss that you want—and then a whole bunch of chemistry to keep it stable on the store shelf. So, we're only a component in there. We're a very important component because we are—think of it as the glue that holds the whole thing together. And that's why it's important that we have the formulation knowledge and capabilities in-house.

Generically, what I believe strongly in and what we more or less have done across the board in Arkema R&D is that our research goes downstream of where our product is. So if I'm developing chemistry to sell to a coating company, we have the ability to formulate coatings, make them and test their performance here. Another



PERFECT BEAM

Kynar coating has been around for 50 years, and part of the durability of the brand as well as the coating itself is that technicians, such as this one, can measure its dimensions with laser precision so that when a skyscraper’s Kynar-coated metal cladding goes onto a building, it stays colorfast, and impervious to weather, sun, chemicals and pollutants.

You now see LEDs in taillights of automobiles, in your houses—they’re everywhere, and it’s a high-growth market. And so the platform was optics around manipulation of light in Plexiglas. And we find that spawns a lot of products addressing customer opportunities and challenges in the lighting industry, the display industry, the taillight industry and some other industries that would take me a lot more words to describe to you.

example is a fuel line. At the end of the day, we’re not going to make the fuel line, but I find it very important that we’re able to actually extrude complicated, multilayer tubing and test its properties in order to approach our tubing customers with formulations and processing conditions. We want to know as much about how our products will perform in the application as our customers—even more, if possible. So if they have a failure—I think this would be interesting for the Army, actually—we find it’s very important to have fully integrated R&D capability. If there’s a failure in a test or qualification, we want to be able to have an answer for that, to be able to say, “Well, it probably failed because the process conditions were too high or too low, or too this or that.”

We’ve got reams of data. You can imagine for things like skyscrapers, you need to have long-term weathering, samples

sitting out in the sun in various regions in the world for decades in order to demonstrate capillary tension on the weatherability of this stuff.

Army AL&T: Kynar is 50 years old and by all accounts a great product. Can you tell us anything about its development that would give us insight into how the original requirements might have evolved over the years? Or have they?

Dirkx: This may not be the best example for this question, in that it is often considered the benchmark in its applications and competitive products are trying to meet the performance targets set by Kynar. That being said, there are some requirements that have driven product changes over the years. One example would be the local VOC [volatile organic compounds] requirements that drove us to develop solutions that allowed our customers to meet the more restrictive regulations.

Army AL&T: That must be tough to do.

Dirkx: What's hard to do is to make the change. A number of your questions are about changing requirements. It's hard when a customer has 30 years experience with a product—remember we have those test panels—they all have them, too, out in the sun. So when we come and want to make a change, they want to have some confidence that they're not going to sacrifice anything on the longevity. Yeah, it's difficult.

Army AL&T: When you talk about these local VOC requirements, do you see regulation coming down the line and say, "Okay we've got to prepare for this, we've got to be able to change the formulation so that we can meet these regulatory requirements?" How does that work?

Dirkx: That's a big question. There was a time, whether we're talking about the consumer space or the industrial space, where all paints were solvent-borne. You remember probably painting rooms and the odors were quite strong, and what you're smelling of course is the vaporization of the solvents. The industry, over a long period of time, has shifted more toward water-borne or water-based coatings.

And largely that was driven by regulatory requirements. So we could see that coming. And again, we're not making paints, we're making components in paints. But just the way I explained it to you a moment ago, that's another important reason for us to have formulation capabilities, the same kind of capabilities our customer base has, in order to demonstrate that we could move our components—and by the way, this happened in baby steps. The first thing you can do is go to lesser amounts of solvent. You have a mixture of solids and liquids in a gallon of paint. The industry



TOWERING ACCOMPLISHMENT

Liberty Place One and its sister tower, Liberty Place Two, completed in 1987 and 1990 respectively, help define the skyline of Philadelphia, PA. The glass exteriors of these structures are complemented by durable, Kynar-coated metal cladding.

moved to what they call “higher solids.” So one of the ways you can meet the new regulations is to put in less solvent and more solids—more Kynar, more pigments, more other stuff, which is not only a change in chemistry on our side, but also a lot of reformulation. And then, of course, you must demonstrate that the performance isn’t compromised out in the field.

The next step was to go to water-based coatings. And again, now you’ve almost completely eliminated the solvents. There’s little bits of volatile organics that are left, but not much. And again it’s the same thing: We have to develop new chemistry, new formulations, and demonstrate that the finalized coatings, the properties, aren’t compromised in any way. So those are big changes that took a long time.

And we saw it coming, as [did] a lot of suppliers. We’re not alone. And we went through the process with our customers to help them meet the new regulations.

Army AL&T: How does the process of developing chemicals or chemical compounds work? That is, when you see a need or a trend—such as nano, omniphobic and superomniphobic coatings that have so much promise—how do you go about establishing the requirements for developing future compounds?

Dirkx: I would say that for what we do, establishing the requirements comes a bit later. We often talk about identifying unmet needs and trying to differentiate those that are a real pain point for our customers or our customers’ customers versus those that would be a “nice to have” solution. With this unmet need in mind, we can then look at how we might develop a solution from the tools in our toolbox. With a potential solution in mind, the marketplace is again engaged



It’s a great example of how their question is framed in what they think you can deliver. They look at the hammer you have and they give you an answer based on that.



DOWN TO A SCIENCE

Arkema uses state-of-the-art sophisticated analytical equipment that yields an understanding of material characteristics on a molecular level. “If you’re working at the molecular level ... and you’re trying to convince somebody that you’ve got a change that’s going to bring value ... it better be damned compelling,” said Dirkx.

in order to validate the need and to begin the discussion regarding requirements or specifications.

We think of those things as platforms, about some of the things you're describing. So if I take nano as an example, sure, we're doing stuff in the nano world, and we have for decades. What would happen that became kind of interesting over the last decade and a half or so is that first, our analytical tools have improved to the point where you can actually start to visualize some of this. So it made it real for people.

But to come back to your question, we can talk about something like block copolymers as an example.

Army AL&T: And what are those?

Dirkx: This is a hard one to describe. If you think of a polymer as a kind of a plate of spaghetti, it's all these long chains of molecules represented by the noodles of spaghetti. The property of that material will be based on the chemistry of these long spaghetti noodles, how long they are and how they're held together, the bonding in between. One of the options you have in making a polymer is to think of one of those noodles. It's got two ends to it. One end is one chemistry and one end is another chemistry, and so we refer to those as blocks. So put a line in the middle of that thing. Half of it could be hydrophobic and the other half could be hydrophilic—water-loving and water-repelling. And you can marry those chemistries, again at a nano scale. Now the properties of that polymer that's made up of all that plate of spaghetti has the combination of the two properties that I just gave you as an example.

The world knows about block copolymers, but my point was to use that as



FILM INDUSTRY

An Arkema technician tests experimental polymer film. As Dirkx explains it, the company's technology goes downstream along a supply chain of parts suppliers in a variety of industries. Because of that, the company needs to be able to formulate and make products that their customers might make in order to make sure they can meet customer requirements.

another example, like nano, of what we would consider a technical platform. Or I think I talked about it as a tool in our toolbox that we would use as a potential solution to a challenge in the marketplace or an opportunity in the marketplace. And we call them a number of things—core competencies, platforms—that define our skill set inside of Arkema, that

we [use] to try to bring solutions to the marketplace.

Army AL&T: The chemical industry is heavily regulated, and Arkema is an international company. Do you take regulatory requirements into consideration when establishing requirements for your research and development? What sort of

regulatory approval process do you have, and how does it affect your requirements?

Dirkx: From the way that you ask this question, you clearly understand some of the reasons why our industry doesn't like to change. On top of being heavily regulated, the supply chain is long, and a change requires requalification down the whole line. Imagine that I have a new low-permeability polymer to offer as a fuel line material. We have to convince the tubing manufacturer, who likely has to convince a component manufacturer, who has to convince an OEM [original equipment manufacturer] like Ford or GM. If they are convinced, specific qualification testing has to be done that takes time and money. Therefore, the new offer must be compelling enough, either from a cost/performance point of view or a regulatory point of view, to drive this change. For this reason, new regulations are often what drives change and, therefore, opportunity. For product and process development projects, we use a gated process that ensures that our

health, environment and safety people are engaged early in the process.

Army AL&T: In the military, you often hear about the first-, second-, third- and fourth-order effects of things, whether it's training or the logistic supply chain or something else, as you described. Can you talk about the kinds of obstacles you face when you try to push something into a different space?

Dirkx: I've been in this new product development business for a number of years now, so I consider myself a student. I still have a lot to learn, but I've learned a lot over the years, too. So I tried, first, to paint the picture of why industry, particularly the chemical industry, is so resistant to change. And remember, chemicals are part of everything, so it doesn't matter whether you're talking about your Teflon pan or your automobile.

At the basis of that is somebody making chemistry in a kettle to get to the parts that are assembled into your automobile. And so if you're working at the molecular level making your chemistry and you're trying to convince somebody that you've got a change that's going to bring value through that product change, it better be damned compelling.

If I take automotive as an example, what are the big things driving them? Well, these days they worry about weight a lot, so things that can help take weight out of the automobile are very interesting. It helps efficiency. It helps them move to electrification. It's something that will capture their attention. And, of course, the old classic: costs. They will be interested in anything you can do to drive costs down. But if I take those two examples, I may have something in my labs that is consistent with that, which gives me a good head start, but my customer

is way upstream. He's not the guy making the automobile, he's probably making a part that somebody else is selling to somebody that's putting that as part of an assembly that goes to the automotive guy, who's clicking together a bunch of assemblies.

You've got to be able to communicate that value all the way down that supply chain. And if it doesn't bring value to somebody in that supply chain, they're a potential block. And it's got to be compelling enough. If it's a minor cost reduction, it may not be interesting enough because they've got to do all that requalification, potentially. If it's a critical component, there's a lot of requalification, and it costs real money to do that.

You can imagine why all this would make it very challenging to implement a change. You have to find something that's compelling enough, which means it creates enough value that you've got a partner through the chain to make that change.

Army AL&T: So, if, for example, you're approaching an automotive company, you would feel that whatever this new thing might be has to be a home run rather than just a single or a double.

Dirkx: This is where I wanted to come back to. When you talk about requirements, my closest analogy in my world would be regulation. This is where regulation can really drive change, and why it's important that we keep our ear to the ground, anticipating regulatory changes. Maybe somebody demands that a certain percentage of an automobile has to be manufactured from reusable parts or be bio-based; or they have a certain mile-per-gallon limit they have to hit; or, more specifically, new emission requirements. One example is the move to

If you think of a polymer as a kind of a plate of spaghetti, it's all these long chains of molecules represented by the noodles of spaghetti. The property of that material will be based on the chemistry of these long spaghetti noodles, how long they are and how they're held together, the bonding in between.



THE BONDING ELEMENT

Although Arkema keeps the ability to make polymer foams, such as this one being tested by a technician, it won't sell the foam directly. It sells the components. "Most often, if you buy an Arkema product, it's going to be a component of the thing you buy," said Dirx. "We're a very important component because we are—think of it as the glue that holds the whole thing together."

ethanol-based fuels. They're highly corrosive, and they're much more so than straight gasoline. And they tend to permeate fuel lines more readily.

So when the industry moved in that direction, those regulatory changes created opportunities for us to develop new polymers, new multilayer solutions, new tubing, and that forced that whole supply chain that I previously described to get aligned to offer new solutions to the automotive industry. So regulations are very powerful in driving change.

Army AL&T: How much of your product development is developing a completely new product—the "new Kynar," for example—and how much of it is trying

to find different applications for products you've already developed? With different applications, do you establish new requirements?

Dirx: There is a third type of R&D work as well, qualification of our current products in current applications but at new customers, and a fourth, technical service to keep our products running competitively at our current customers. You need to have a balance of these, and each business unit will have a different balance governed more or less by the markets they serve, their current business strategy and the window of opportunity.

But our platforms tend to spawn projects, and the best platforms are those

we can draw from to solve a number of problems in the marketplace or with our customers, or to bring value to our customer base. Block copolymers is a good example of that, and I'll give you another one. We saw, a decade ago or so, this shift in the lighting industry to LED technology. And, of course, next it's going to go to what's called "OLED" technology, organic light-emitting diodes. In our Plexiglas division, besides the taillights I mentioned, we have a number of lighting applications. Just like in computer displays, there are a lot of places where there's an interaction between polymers and light. In particular, Plexiglas often finds use in applications where appearance is really important, this interplay with light. We said, "This is going to

be important in LED, it's important in lots of things we do." So we built a core competency in understanding how to put additives in the Plexiglas to allow us to manipulate or manage its interaction with light, whether it's reflection or transmission or diffusion. We've developed a whole family of products now that help in the diffusion of LED light—the extraction of light from LED fixtures while hiding the fact that they're sharp pinpoints of light.

You now see LEDs in taillights of automobiles, in your houses—they're everywhere, and it's a high-growth market. So the platform was optics around manipulation of light in Plexiglas. And we find that spawns a lot of products addressing customer opportunities and challenges in the lighting industry, the display industry, the taillight industry and some other industries that would take me a lot more words to describe to you.

Army AL&T: Was there ever something that someone else developed which, after

I've been in this new product development business for a number of years now, so I consider myself a student. I still have a lot to learn, but I've learned a lot over the years, too. So I tried, first, to paint the picture of why industry, particularly the chemical industry, is so resistant to change.

seeing it, you thought you should have been there first?

Dirkx: Yes, of course. We try to be first in areas that are of strategic interest to us but can't employ the huge resources needed to lead in every area. You have to pick your spots.

Army AL&T: A lot of people, when they hear the word "chemical," tend to think of things that are exotic or poisonous. As a chemist, do you tend to look at everything around you as chemical in nature?

Dirkx: Yes, I do. But think of me more as a materials guy, too. I think about it at the atomistic level, I think about it at the materials level. So it's cellulosic or it's metallic, or it's conductive or nonconductive, or it's porous or it's solid, or it's thermally conductive or it's thermally insulating. But absolutely I do. In fact, I tell my wife that's why I like to cook. There are a lot of analogies in the materials world when you make stuff by mixing things together. You have something called solid state diffusion, that's the mixing of flavors, and it's time and temperature that drives mixing like that. Yes, unfortunately, I do think that way. Think about making your bacon and eggs in the morning. Don't you get a little different result if you're using a stainless steel pan rather than a nonstick pan?

Army AL&T: Do you ever experience what we term "requirements creep," in which something with minimal requirements suddenly has to do and be everything, and so it ends up burdened with expectations?

Dirkx: I'm not sure that we do experience it in the manner you are suggesting. We are often working toward performance specifications or targets rather than "requirements." These often do "creep"

on us, to use your terminology. It's a competitive world out there, and our competitors are not sitting still!

Army AL&T: Your website has a teaser that talks about "high pressure, low budgets and a short project timeline" in working with a partner company. This is exemplary of what the Army would like to achieve all the time. When you decide to work with a partner, does it make any difference if the partner is a large or small business?

Dirkx: In my opinion, size is not always as important as other things. For example, finding someone who has assets or knowledge complementary to what we have can be more important for project success and acceleration. We also try to pick partners that have some history of working well with others and understand the concept of sharing the value that is created by working together.

Army AL&T: When you find a new application for an existing product that's outside of Arkema's regular business lines, what steps do you take next? Would you consider starting a whole new business line if you felt you could address that need more effectively than the competition? If so, what does that process entail?

Dirkx: In this case, if the opportunity is large enough, it will be prioritized as a project and assigned resources. If it is a really new application, then a partner or collaborator is likely going to be needed and a joint-development agreement approach would be considered. However, we could decide to develop our own in-house lab capability if we think it has additional leverage. For something that is really new, requiring a longer-term development period, not a direct fit with an existing business, and offering significant growth, we do have a centralized

incubator that we use to develop new technical platforms.

We try to keep our ear very close to our markets, our customer base, and that's the driver. At the same time, it's a bit of an art rather than pure science to try to figure out what's really compelling enough for our customers to drive our activity.

And we have a new product development process that involves a management process that helps us determine the potential success of a particular project. We think we have way more opportunities than we have people to work on them. So it's about prioritization as to where we put our resources and what our best bets are.

There can be different opinions inside the company on that. And we have a process for working through that, to figure out how best to make sure that we don't spend a ton of money on failures—try to fail early, you know.

Army AL&T: What could the Army learn from the way Arkema develops requirements? Or from the way that Arkema conducts R&D?

Dirkx: It is hard for me to say because I don't have a lot of insight into how the Army does this. There are many studies on market pull versus technical push. My experience says that you need a combination of both. Very often the market doesn't know what is possible when they're asked what is needed. If you talk to many of the commercial folks, ideally everything is market pull because they see that as the lowest risk in the marketplace, they've got a guy that's ready to buy.

When you ask your customer what they're looking for, they'll answer based on what they think you can bring. For example, I was in business for four years, and during



BAND OF SCIENTISTS

Arkema's products include hydrogen peroxide for cleaners, detergents and oral care products, components in lithium ion batteries for cell phones and photovoltaic solar panels, nutrients for chicken feed and polymers for vehicle engines. Ultimately, collaboration and teamwork are a critical part of the company's R&D success.

that time I took on some very technical businesses. One was a catalyst business. And I was talking to a polymer guy who used our catalyst to make a polymer. I asked him, "What are your needs, what's the next great thing we can do for you?"

He said, "Well, when we use this catalyst, the polymer comes out a little bit yellow. We don't really like that yellow color, and our customers don't like that yellow color. We'd really rather see it on the blue side." And I thought, "I think we know how to do that." We went back to our laboratories, and by adjusting the chemistry we came back in some months—it wasn't quick because we wanted to demonstrate it ourselves—we put it in their hands and they went through studies and evaluations. And, son of a gun, they got a polymer more on tone toward blue than yellow.

They didn't order a single pound. And I went back and I said, "Excuse me, but this was exactly what you were looking for. I

thought we hit it right on the money." He said, and remember we're now up the supply chain, "Well, it turns out our customer really wants no color." And I just spent six or eight months deliberately designing blue because that's what he said he wanted. I could have spent the time developing no color and probably could have hit that target. His comment to me asking for blue was because he knew that it was probably possible to deliver blue.

That's a very simplified example. Now think of if you translate to much more complicated systems and questions and multiple suppliers, it can compound the issue. It's very complex. But it's a great example of how their question is framed in what they think you can deliver. They look at the hammer you have and they give you an answer based on that. And you can chase your tail. Did we know that we needed a camera in our phone before it was developed?

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SPOTLIGHT:

MR. TIM O'DAY



Applying the ABCs of BBP to get a better vehicle

MR. TIM O'DAY

COMMAND/ORGANIZATION:

Joint Program Office for Joint Light Tactical Vehicles, Program Executive Office for Combat Support and Combat Service Support

TITLE:

Procurement analyst

YEARS OF SERVICE IN WORKFORCE: 7

EDUCATION:

B.B.A. in business management, Walsh College

DAWIA CERTIFICATIONS:

Level III in contracting; Level I in program management

AWARDS:

Commander's Award for Civilian Service; Achievement Medal for Civilian Service

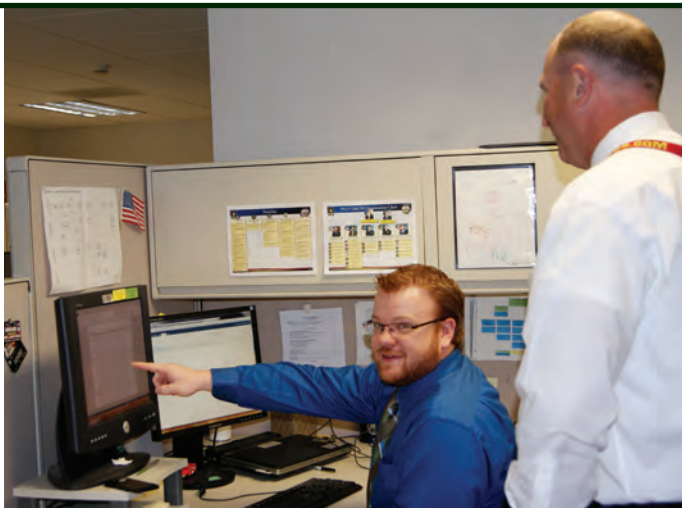
Tim O'Day got his start in acquisition seven years ago as an intern, working as a contract specialist at the TACOM Life Cycle Management Command Contracting Center in Rock Island, IL. "I thought the program would be a steady, stable job with a lot of potential to move up or to gain experience in other areas," said O'Day, now a procurement analyst. While at TACOM, he was able to try his hand at various aspects of the procurement cycle, helping to prepare solicitations, evaluate proposals and administer awarded contracts.

He's now part of the Joint Program Office for Joint Light Tactical Vehicles (JPO JLTV), part of the Program Executive Office for Combat Support and Combat Service Support (PEO CS&CSS). The program aims to close a capability gap in existing light tactical vehicle fleets and give commanders a flexible, transportable, protected, networked and reliable expeditionary vehicle.

In 2013, the program earned the David Packard Award for Acquisition Excellence, which recognizes achievements that exemplify the goals and objectives established for furthering life-cycle cost reduction and acquisition excellence in DOD.

O'Day is part of a team that recently earned praise for its efforts to develop a request for proposals (RFP) issued earlier this year for low-rate initial production (LRIP) and full-rate production (FRP). The Army plans to make a Milestone C decision and award a firm-fixed-price contract to a single vendor this year that will cover three years of LRIP and five years of FRP. Under the joint program, the Army and the U.S. Marine Corps will purchase a total of approximately 55,000 vehicles.

O'Day worked with the Office of the Secretary of Defense and the deputy assistant secretary of the Army for procurement to ensure that JLTV's deviations from the Army Federal Acquisition Regulation Supplement and DOD Source Selection Guide met headquarters' expectations, and led the development of source selection criteria, a process that included numerous working group meetings with program management, contracting, legal and requirements representatives.



LIFESAVING PROCUREMENT

O’Day works with Darrell Brown, PEO CS&CSS’ staff program protection lead. O’Day has been closely involved in the JLTV acquisition, ensuring that deviations from the Army Federal Acquisition Regulation Supplement and DOD Source Selection Guide met headquarters’ expectations. He also led the development of source selection criteria. (Photo by Rae A. Higgins, PEO CS&CSS Strategic Communications)

The source selection criteria incorporated several Better Buying Power (BBP) initiatives, O’Day said. The RFP included multiple affordability requirements and anticipates evaluating future life-cycle costs as part of the best-value decision, both of which are part of the BBP initiative to achieve affordable programs. In line with the BBP initiative to promote effective competition, the program leveraged competitive prototyping by having three competing contractors in the engineering and manufacturing development phase before selecting a single vendor for the LRIP and FRP. Program officials also are evaluating an option to purchase the technical data package as part of the best-value decision, which will help to ensure future competition.

“The biggest challenge in this job is getting all of the stakeholders and organizations to agree on one path forward,” said O’Day. “And we do that with a lot of brainstorming—proposing alternatives until we devise a plan that everyone is happy with.”

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

I’m a procurement analyst for JPO JLTV, which basically involves preparing procurement packages that are subsequently executed by our contracting center and serving as a liaison between our program office and the contracting center. This is important to the Army, as I’m able to help streamline the acquisition process by providing contracting-related advice to our program office and make sure that the needs of our warfighters are accurately

reflected in the procurement packages that are submitted to our contract center.

How did you become part of the AL&T Workforce, and why?

I applied through the intern program when I was in college and was hired as a contract specialist at the TACOM Contracting Center in Rock Island, IL. A few people in my family have worked as DA civilians and I was interested in finding a similar position.

What do you see as the most important points in your career with the Army AL&T Workforce, and why?

I view my current position as the most important point in my career, as I’m playing a role in the development of a vehicle that is intended to save more lives and will ultimately be ridden by almost anyone who serves in the Army after the vehicle is fielded.

What’s the greatest satisfaction you have in being a part of the AL&T Workforce?

Being able to work on the development of a vehicle that will ultimately save more lives.

Acquisition is a very broad term encompassing a lot of different job specialties, with many career tools available to them. What advice would you give to someone in an acquisition position who would like to further and broaden their career?

Don’t be afraid to seek out opportunities in other organizations in an attempt to broaden your experience and to gain perspective from another part of the acquisition process.

What’s something that most people don’t know about your job? What surprises outsiders most when you tell them about your job?

When I speak to people outside the government, the thing they are normally most surprised by is the length of time it takes to develop and field a new system—they think it should happen more quickly than it does. One thing they’re not usually aware of is the complexity: the number of steps that are involved and the rules and regulations we have to follow. I’ve met a lot of people who are familiar with private-sector acquisition; for the Army, it’s a lot more complicated.

—MS. SUSAN L. FOLLETT

IMPROVING PROCESS IMPROVEMENT

The Army Office of Business Transformation aims to improve the way it does continuous process improvement with scientific rigor, knowledge management and data mining to make sure the Army uses the right methodology for the right job—and in so doing, potentially saves billions.

by MG Camille M. Nichols and LTC Jeremy Gwinn

The Army has employed a variety of techniques for continuous process improvement (CPI) for many years. Some have resulted in projects that saved the Army millions of dollars, while other efforts have not yielded the expected results. Improving the business processes of the Army is, in part, why the secretary of the Army established the Office of Business Transformation (OBT) in April 2009. By applying rigorous analytics and data mining and exploring the appropriate type of CPI methodology for a given problem, the Army will do much better in a fiscally restrained and challenged future. But we're not there yet. CPI is still widely perceived through the lens of Lean Six Sigma (LSS). In that sense, it is a lengthy, formal, strictly implemented process that is too arduous to address many of the practical challenges we confront in the Army. Sometimes we need different tools for different problems.

The definition of CPI does not justify such a negative response. MITRE Corp.'s Systems Engineering Guide (2014) defines CPI as "the set of ongoing systems engineering and management activities used to select, tailor, implement and assess the processes used to achieve an organization's business goals." Simply stated, CPI embodies the methods that organizations use to solve problems and improve performance. CPI is about making an organization better. So, how have we missed the mark?



LOADING THE TOOLKIT

The Army approach to using LSS for CPI uses the five-phase DMAIC process, which instills a data-driven, empirical approach to problem-solving. Giving CPI practitioners access to training in a variety of problem-solving methodologies will translate into programs that yield better financial and operational benefits for the Army. LSS is not the only tool, however. Some Army organizations have successfully used others. (SOURCE: U.S. Army Office of Business Transformation)

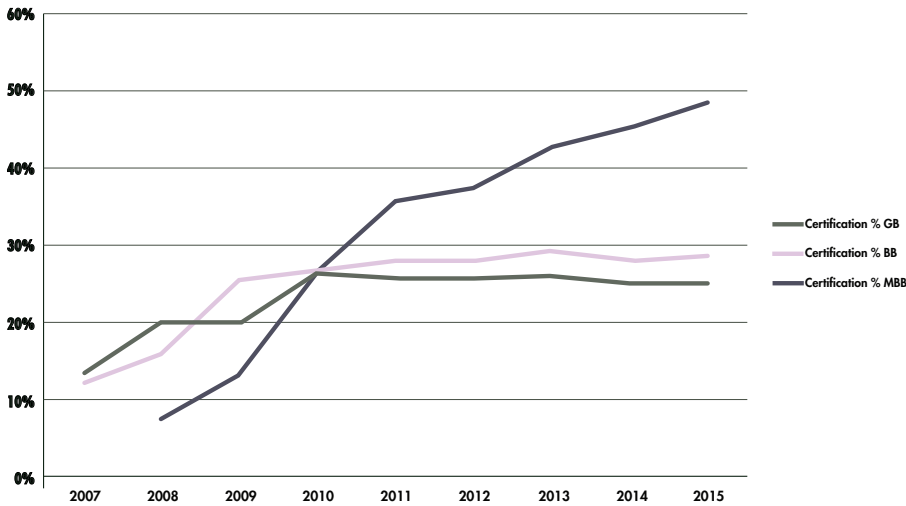
Today, we find many Army organizations reducing their CPI capabilities, ostensibly to decrease organizational operating costs and manning requirements—exactly what CPI is intended to do. That leaders are cutting such a capability indicates a conundrum. The problem is not with CPI itself, but rather its implementation in the Army over the last decade—almost exclusively via the LSS methodology. To achieve a true CPI capability for the Army, we must advance our approach on improvement strategies by implementing all of the CPI tools available and addressing how they apply to various challenges, while insisting that practitioners focus on results rather than adhering strictly to a particular methodology.

EARLY EXPECTATIONS

Efforts to implement CPI methods have existed in Army organizations since at least the late 1990s. Leadership at the HQDA

level formally embraced CPI in 2005 by issuing memorandums establishing business transformation goals and specifying the adoption of Lean and Six Sigma methods. The establishment of an LSS Program Office and “LSS capability deployments” to select organizations followed. With program launch came high expectations that included goals of multibillion-dollar savings and operational benefits after the first few years. While some LSS deployments have achieved impressive financial and operational benefits, the early goals have not been met Armywide.

A review of the Army CPI program today reveals a mixed picture. Nearly 13,000 Soldiers and Army civilians have been trained as Green Belts (GB), Black Belts (BB) or Master Black Belts (MBB); however, the percentage of these candidates that actually completed an initial project and earned the certification is hovering below 30 percent for GB and BB and less than



CHARTING PROGRESS

The percentage of Green, Black and Master Black Belt candidates who completed an initial project and earned the certification hovers at 25 to 50 percent. Completed projects—with timely, tangible and measurable results—are the most effective way to demonstrate to leadership the benefits of investing in CPI. (SOURCE: U.S. Army Office of Business Transformation)



DEVELOPING A CPI CULTURE

Members of a Lean integrated process team (IPT) at Aberdeen Proving Ground (APG), MD, work on developing a new “Lean for Contracting” course that will apply LSS techniques to contracting processes. Facilitating the meeting are A.D. Barksdale, center, CPI Deployment director for the U.S. Army Contracting Command (ACC), and Jennifer Staggs, left, ACC’s CPI procurement analyst. The IPT includes ACC-APG members Gloria Dent, left center, operations chief; Rob Perry, right center, Contracting Operations Division branch chief; and Kevin King, division procurement analyst. (Photo by Betsy Kozak-Howard)

50 percent (although trending upward) for MBB. This is not a good return on investment for the training of our personnel. Major reasons that projects are not completed includes the lack of supervision of the belt candidates as well as a lack of organizational interest in the projects identified; projects are seen as a means to get a candidate certified rather than being focused on solving real problems for the organization. Another source of frustration that senior leaders express is the inflexibility that certified practitioners often exhibit when working a project, because of the lengthy process that is unyielding and nonresponsive to urgent problem resolution.

There are stellar examples of programs that have reaped significant, concrete benefits, in organizations with missions that align well to the need for LSS techniques. During FY13, the U.S. Army Materiel Command (AMC) completed 342 LSS projects with an estimated financial benefit of \$88 million, representing 4.6 percent of the command’s operations and maintenance budget and \$441 million in various other programs, including the Army Working Capital Fund. (Such savings resulting from CPIs can only be projected until the period for which they are estimated has concluded and the projection is proven valid.)

CURRENT STATE OF PROCESS IMPROVEMENT

The Army has focused on using LSS for CPI over the last decade. This approach uses a five-phase process: define, measure, analyze, improve and control (DMAIC). There is nothing particularly revolutionary about DMAIC. In fact, a variety of other common problem-solving methods, such as the military decision-making process or campaign design, follow roughly the same process. Generally, DMAIC starts by defining the current environment

By having an agile, responsive and focused cadre of CPI practitioners helping solve problems, the Army is poised to save billions of dollars and gain efficiency in leaning its processes.

and the problem to be solved, analyzing causes and effects, and developing and implementing a course of action to achieve a desired end state.

The value of the Army’s approach is that it arms practitioners with a time-tested scientific methodology that is repeatable and auditable. It makes available a wide variety of problem-solving tools and instills a data-driven, empirical approach to solving nearly any problem. The breakdown between theory and practice occurs when practitioners attempt to follow the methodology in a lockstep manner every time, instead of adapting it to fit the complexity of real-world problems. This is not an indictment of our practitioners; it is more about the way in which we train and develop practitioners and one more reason that LSS has had limited impact in improving some of the Army’s most significant and recurring business process challenges.

While CPI is larger than LSS, the two often are spoken of as if synonymous. Lean and Six Sigma are just two sets of tools that an organization can apply to

solving problems. There exist many more tools that, unlike Lean or Six Sigma, are not part of an Army-level program but nonetheless have been tremendously successful when applied appropriately in select Army organizations. Examples of other methodologies in use within the Army include value engineering, system dynamics, International Organization for Standardization certification, total quality management, the Baldrige Performance Excellence Program and high reliability organization theory.

It is not possible for every organization to practice every possible CPI methodology, nor is it desirable. Organizations should develop an understanding of problem-solving fundamentals, selectively adopt CPI tools based on their unique requirements and acknowledge that every organization may benefit from at least one or two of the tools. In some cases, LSS may be the right methodology, but having concentrated all of our CPI expectations on LSS at the Army level, we should not now be surprised that our expectations are unmet.

When an Army organization does find an effective solution to a CPI challenge, the solution often fails to propagate across the enterprise, even while other organizations are struggling with a nearly identical problem. This is essentially a matter of knowledge management, but simply creating an online repository is not enough.

The Army already possesses a repository in PowerSteering, the Army system for tracking LSS projects, which is available by invitation to LSS belt candidates. But the Army lacks a capability to identify successful, replicable projects and disseminate them across the service. Every year, the undersecretary of the Army recognizes outstanding business CPI project efforts through the Lean Six Sigma

Excellence Awards Program (LEAP), based on the outcomes achieved. While LEAP serves to highlight excellence in CPI for the broader community and provides an additional incentive to achieve results, it is based on agency and command nominations—not on rigorous data mining using an effective knowledge management capability encompassing all completed projects. We need to do more to reap the benefits of real successes Armywide. As is the case with a lot of Army programs, there are many knowledge management and capture tools, most of which have been developed independently, with different owners, and consequently are not interoperable. That’s one of the reasons it is very difficult to do rigorous data mining—and one of the reasons that OBT views this capability as critical to the success of truly lasting CPI.

TOWARD A CPI CAPABILITY

The OBT is charged to “assist the Army in transforming its business operations across the Army enterprise to more effectively and efficiently use national resources.” OBT must assist the Army in moving beyond LSS to develop, integrate and support broad-spectrum CPI methodologies. To be successful, stakeholders across the enterprise must collaborate to accomplish these six objectives:

1. Ensure that practitioners have access to training in various problem-solving methodologies. After evaluating the vast number of CPI methods available and gaining input from the field, OBT needs to provide access to the training through in-sourced and out-sourced classroom and online instruction.
2. Arm practitioners with methods and means to advance CPI and embrace their role as change agents. Rather than simply training individuals from around the Army and sending them back to their organizations,



LEAPS OF CHANGE

Recipients of the Army LEAP Awards for LSS excellence gather in the Pentagon Hall of Heroes in September 2014. Also pictured are Undersecretary of the Army Brad R. Carson (front row, third from left), Director of the Office of Business Transformation LTG Thomas W. Spoehr (front row, third from right), and then-Deputy Commanding General of AMC LTG Patricia E. McQuiston (front row, center). While programs like LEAP are effective in highlighting excellence in CPI, the Army lacks a capability whereby it can identify successful, replicable projects and disseminate them across the enterprise. (Photo by SSG Bernardo Fuller)

OBT will serve as an integrator, point of collaboration and team builder. By fostering a community of practice, we can connect practitioners to share lessons learned, solve cross-functional challenges and, by implementing solutions, act as change agents.

3. Gain senior leader understanding of the requirement and support. By engaging directly at the level of HQDA principals and deputies and commanders and their deputies, we can better understand their needs for a CPI program and possible obstacles to successful implementation.
4. Help program directors improve their programs. Just as senior leader engagements will help to generate essential support and establish the vision required for needed change, regular two-way engagement with directors of organizational CPI programs can assist in implementing change.
5. Disseminate best practices Armywide to drive lasting change. While program directors and practitioners share lessons learned throughout the community of practice, OBT provides the knowledge management framework and

data-mining function to identify candidates for scaling up or replication.

6. Deploy master CPI practitioners and teams to help identify and solve enterprise-level problems. In some cases, enterprise-level problems require cross-domain expertise (e.g., human capital, finance and information technology); therefore, OBT can support those efforts with Army-level coordination and advocacy.

CONCLUSION

OBT's efforts to reinvigorate the Army CPI program will succeed only with the full engagement of organization leaders and our practitioners as well as collaborative dialogue and continuous feedback. Most importantly, our practitioners must achieve results that are timely, tangible and measurable. The completed project is still, and will always be, the coin of the realm and the only true way to demonstrate return on investment for leadership.



LEANING OUT

Electronic Equipment Inspector Jim Mason, part of the CPI Directorate at Tobyhanna Army Depot, PA, inspects AN/VRC-92F radio system inventory at the depot’s In/Out Cell. A focused and responsive cadre of CPI practitioners could help the Army save billions of dollars and gain efficiency in leaning its processes. (Photo by Steve Grzezdziński, U.S. Army Communications–Electronics Command)

By having an agile, responsive and focused cadre of CPI practitioners helping solve problems, the Army is poised to save billions of dollars and gain efficiency in leaning its processes. We can accomplish even greater results than we have achieved over the past decade by broadening the aperture to include the full suite of CPI methodologies and by prioritizing outcomes over process.

In doing so, we can achieve a broad-spectrum CPI capability for the Army business mission area. But this will not happen overnight, and it will not happen at all if we do not retain some CPI capability in our organizations. It is a

multiyear undertaking and a team effort among the OBT, CPI practitioners and senior leaders across the Army. Our ability to maintain Army readiness at reduced funding levels will depend on our ability to decrease our operating costs through CPI efforts.

For more information on the Office of Business Transformation, go to <http://www.army.mil/obt>.

MG CAMILLE M. NICHOLS is director, business operations in the Army OBT. A graduate of the United States Military Academy at West Point, she holds four

advanced degrees, including a Ph.D. in engineering management from George Washington University. She is a member of the Army Acquisition Corps, having served in various acquisition positions over the past 25 years, and is Level III certified in project management and contracting.

LTC JEREMY GWINN is an infantry officer serving as a strategic planner in the Army OBT. He holds an MBA from the University of North Carolina at Chapel Hill and a B.A. in history from Pennsylvania State University. He is an LSS Black Belt candidate.



SAME RADAR, NEW HOME

Requirements necessitated a change in the Sentinel platform, shown here during a February 2014 production qualification test at Redstone Arsenal, AL, and with some ingenuity and a lot of hard work, PEO MS and LEAD came up with a better way of doing business. (Photo by Pete Baldwin, CMDS, PEO MS)



A NEW VEHICLE FOR SAVINGS

PEO MS and Letterkenny Depot partner on improving radar platforms, and create process standards that align with Better Buying Power initiatives on enduring competition while rapidly fielding equipment to the warfighter and sustaining the organic industrial base.

by CPT Jake Brady

With a pressing need for an improved AN/MPQ-64 Sentinel radar vehicle platform and no time to procure a new platform or radar, the Program Executive Office for Missiles and Space (PEO MS) teamed up with Letterkenny Army Depot (LEAD), PA, to modify an existing platform in what could be a model for partnership with the organic industrial base. This effort, which moves the Sentinel from a modified High Mobility Multipurpose Wheeled Vehicle (HMMWV) to the Family of Medium Tactical Vehicles (FMTV) platform without requiring modification of the radar itself, overcame a number of challenges and led to several process improvements for project and product offices to partner with Army depots.

AN URGENT NEED

The remount of the Sentinel radar resulted from an equipment redesign that added weight and surpassed the HMMWV's load capacity. The AN/MPQ-64 radar entered service in 1995 as a system consisting of an X-band radar mounted on a high mobility trailer and an HMMWV prime mover, equipped with a 30kW generator. The vehicle was not armored, as it was originally intended as a rear-echelon asset in a linear fight. As the Army engaged in a nonlinear fight, the TRADOC Capability Manager



WORTH CELEBRATING

Soldiers from 3rd Battalion, 4th Air Defense Artillery, Fort Bragg, NC, stand at parade rest during the Rollout Ceremony of the Sentinel FMTV at LEAD, May 2014. The program's many lessons learned could help others leverage the power of Better Buying Power. (Photo by Laura Brezinski, CMDS, PEO MS)

asked the Cruise Missile Defense Systems Project Office to harden the cab and increase crew survivability within three years. Adding an armored cab exceeded the carrying capacity for the HMMWV, necessitating the switch to a different vehicle platform. The product director decided to develop a modification kit for an FMTV and trailer that would not require modifications to the radar itself. Issuing a new contract would have required nearly two years, from inception to contract award; with an additional year from contract award to design delivery, and a further year to deliver a prototype. This timeline was incompatible with the user requirements and the Sentinel Product Office could not find an existing contract vehicle that could support this work. To meet the user timeline, the product director decided to design

the modification kit on an existing contract. Then, the organic industrial base would be used to build the initial kits and modify the first 50 vehicles. Further, the modification kit timeline was formulated with the option to compete production of the remaining 137 systems.

AN URGENT SOLUTION

The Sentinel team used the Prototype Integration Facility (PIF) from the U.S. Army Aviation and Missile Research, Development and Engineering Center to design the modification kits, ensuring that the government would own the technical data package (TDP). When the PIF provided the Sentinel team an initial design, the Sentinel PO sent it to LEAD for a proposal. This action resulted in the LEAD commander and Sentinel product director signing a statement of work to begin

development. LEAD personnel built the initial kits according to the TDP and, over 10 months, provided modification feedback to the designers. The design feedback produced two prototypes for testing. In addition to producing the modification kits themselves, LEAD also installs these kits on FMTVs (which have been acquired largely through data interchange), remounts the radars and generators from their HMMWV platform onto the FMTV systems, and then ships completed systems to units for fielding. Building prototypes with an immature design presented challenges, but in the end brought a producible government-owned TDP, two prototypes for testing and manufacturing experience for LEAD.

ADAPTING TO NEW PRACTICES

The Sentinel FMTV modification program at LEAD is a new way of doing business for both the depot and the program management office, and as such, presented several significant challenges that needed to be resolved. For LEAD, this program required a new process, as the workforce and infrastructure are optimized for repair and overhaul work, which are quite different than build-to-print work—whereby LEAD builds or modifies components according to the customer's exact specifications. This presents a new set of workspace challenges.

Since the depot is optimized for repair and overhaul, the workspace is oriented on skill centers (e.g., welding or machining), not a continuous production line. So, not only do pieces move around the floor inefficiently, they must be stored once they are completed at one work center before going to the next work center. In addition, there are cultural hurdles that do not hinder the quality of the work, but do affect cost reporting. For this modification work, the workforce

at LEAD was not accustomed to charging hours to the sub-assembly level, thus skewing cost reports. Since the quality of cost reporting is almost as important as the quality of the work, structuring labor charges and accounting systems is particularly important.

The second challenge the team faced was structuring the depot's workload planning software (Logistics Management Program or LMP) properly, including the associated vocabulary. Initially, the Sentinel team did not set up the work breakdown structures (WBS) in the LMP, so that purchase orders would directly correlate to system production. Ultimately, the Sentinel PO set up seven different WBSs in the LMP for the 50 systems that needed modification. As a result of the LMP funding structure, the LEAD team had to do a lot of manual work to generate a cost report by system. Further complicating this work is that depots and program offices use the same terms with different meanings; so when the product office asked about the WBS, the LEAD team was thinking LMP funding structure.

The third significant challenge for the product office was the depot staff's unfamiliarity with Microsoft Project. Since earned-value reporting must be tied to a schedule, and LMP does not produce a detailed work schedule that would suffice for earned value reporting, the LEAD team had to learn how to input a schedule into Project and then load the value into that program at the appropriate level. Project has a steep learning curve and is labor intensive. Unfortunately, the LEAD production controller for the Sentinel project also had to build the integrated master schedule (IMS) in Project as a result of manpower constraints. Because the production controller was stretched too thin to effectively build the



KITTED OUT

Partnering with PEO MS in the modification work on the Sentinel FMTV, shown here with radar detached during production qualification testing in early 2014, allowed LEAD to offset some of the pending reduction in reset work and keep its workforce robust. (Photo by Pete Baldwin, CMDS, PEO MS)

IMS and control the build-to-print work, the Sentinel PO scheduler built the majority of the IMS. Because of conflicting priorities, the production controller had a difficult time finalizing the IMS, leading to a significant delay in setting up earned-value reporting.

LESSONS LEARNED

Despite the challenges laid out above, this effort is on a path to success. With the following lessons learned, many of these challenges could have been avoided.

The Sentinel team travelled to LEAD to help the team with earned-value management and reporting requirements. During that trip, both teams realized that most of the earned-value data was already collected, just not in a centralized way. The teams realized that the LMP funding process would hinder per-system cost reporting for the remainder of the effort. The team took this as a lesson learned about the importance

of establishing the WBS in LMP to facilitate cost reporting. This approach reduces the manual effort of adding hundreds of individual purchase orders into reportable levels in the IMS.

The last point is that while depots are not familiar with earned value, the product office is very familiar with earned value. The Sentinel PO realized early on that the product office would need to assist the depot team in producing an IMS and earned value reports.

The approach outlined above supports several of the Better Buying Power (BBP) initiatives and sets the foundation for future support of those tenets. Since a government facility developed the TDP, the government retains ownership, which helps create an enduring competitive environment. As the organic industrial base is involved in development from the beginning, this modification prepares the depot for this type of work and allows it



ALMOST READY FOR ACTION

Soldiers from 3rd Battalion, 4th Air Defense Artillery, Fort Bragg, NC, help with the rollout of the Sentinel FMTV at LEAD, May 2014. Sentinel’s size, based on updated requirements, necessitated a move from the HMMWV to FMTV. A creative partnership between PEO MS and LEAD made it possible. (Photo by Laura Brezinski, CMDS, PEO MS)

to build spares and reduce supportability costs. By retaining ownership of the TDP, the product manager set the conditions to compete future production of that TDP as a build-to-print modification. Also, since the TDP was developed in a government facility and solely at government expense, the Sentinel PO was able to emphasize standardizing interfaces—all hardware in this case—so that the PO can compete future modifications to the TDP, fostering a competitive environment. The Sentinel PO furthered that environment by only ordering enough systems from the depot to meet initial

demands from the user. This limited approach allows a full and open competition for the remainder of the systems to be procured. The final support this program potentially offers to BBP is to increase the number of competitors for work if the conditions are set in the organic industrial base.

CONCLUSION

To set the conditions for the organic industrial base, and to successfully compete for build-to-print modification work from product officers, the organic industrial base should embrace earned-value

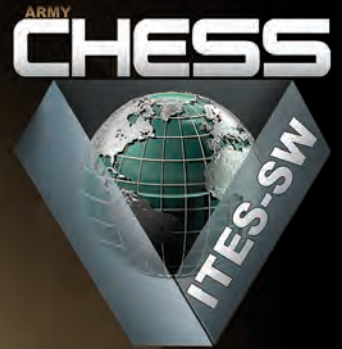
management and invest in the infrastructure to report a time-phased budget. This includes creating an IMS for production work that accounts for costs at the sub-assembly level. Depots are already capable of world-class manufacturing work, but their cost-reporting systems lead to a lack of confidence from customers and prevent the depot from winning more of the work they are capable of performing. Product managers must be willing to assist depot partners if they wish to use the depots to modify equipment quickly and affordably.

Ultimately, depot partnering offers an attractive solution to a number of challenges. Partnering in major modification work allows the depots to offset some of the pending reduction in reset work and keep their workforce robust. Program managers can quickly produce mechanical modifications to extend the service life of their equipment and meet user needs with the option to compete production of the remaining systems. Government ownership of the TDP forces all of this to occur in a competitive environment. The model set by the Sentinel team could help offset some of the future fiscal challenges and streamline the build-to-print work process for program managers and depot commanders.

For more information, contact CPT Jake Brady at Jacob.m.brady.mil@mail.mil.

CPT JAKE BRADY is the assistant product manager for Sentinel Radar at the CDMS PO in PEO MS. He holds a B.A. in geography from the U.S. Military Academy at West Point. His operational assignments as an armor officer include deployments to Iraq as a reconnaissance troop executive officer and Afghanistan as a company commander. He is Level I certified in program management.

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COMMENTARY

FROM THE DIRECTOR,
ACQUISITION CAREER MANAGEMENT
LTG MICHAEL E. WILLIAMSON

SPREADING THE WORD



Join the AAWHonorsTheOath campaign
to share the good work of Army acquisition professionals.

I often write in this column about ways we are working to increase the professionalism of the Army Acquisition Workforce (AAW) through training, education and leadership development. Our people are our greatest asset. It is important that we invest in the men and women who develop and procure capabilities to ensure that our Soldiers always have the decisive advantage.

With this column, I am interested in hearing from you, our AAW members. Whether military or civilian, you began your career by taking an oath to support and defend the U.S. Constitution. Your outstanding work is often done behind the scenes but is vital to the success of our Soldiers. I invite you individually or collectively as teams to record and submit 15- to 30-second videos that answer the question, “How do you honor the oath of office each day?” If you prefer to submit a picture or collage with a caption or a short written statement, those are acceptable as well. Additional information about the AAWHonorsTheOath campaign is at <http://www.army.mil/asaalt>.

The oath we take serves as a solemn reminder of our duties and responsibilities in service to our country. While the Constitution

contains an oath of office only for the president, it specifies that other officials “shall be bound by Oath or Affirmation, to support this Constitution.” During the Revolutionary War, the Continental Congress established oaths for the enlisted men and officers of the Continental Army. The first oath under the Constitution was approved by an act of Congress in 1789. It applied to all commissioned officers, noncommissioned officers and privates in service of the United States. Although the enlisted oath remained unchanged until 1950, the officer oath has been modified throughout history until the adoption of its present wording in 1959.

The oath for civilians dates from 1861. At a time of uncertain and shifting loyalties, President Abraham Lincoln ordered all federal employees within the executive branch to take an oath. Members of Congress echoed the president’s action by enacting legislation requiring employees to take an oath in support of the Union. In 1862, Congress revised the oath and required “every person elected or appointed to any office ... under the Government of the United States” to swear or affirm that they had never engaged in criminal or disloyal conduct. Those government employees who failed to take the 1862 “Ironclad Test Oath”

would not receive a salary, and those who swore falsely would be prosecuted for perjury and forever denied federal employment. In 1884, a new generation of lawmakers quietly repealed the “Ironclad Test Oath,” leaving intact today’s civilian affirmation of allegiance to the Constitution.

The professionals in the Army Acquisition Corps and the greater AAW work hard each and every day to serve the American people and the Soldiers who defend them. They live and honor the oath. This AAWHonorsTheOath campaign is your opportunity to showcase why you chose a career in Army Acquisition; what the oath of office means to you; and what you or your team does each day to honor that oath.

We have the most experienced acquisition workforce in history. With innovation as our watchword, we are building on our strengths to prepare for the future. We are guided by more than 13 years of lessons learned from two theaters and other

operations worldwide. We also have the most educated workforce in history. As of May 31, the AAW is 36,757 strong. Our professionals collectively hold more than 16,403 undergraduate degrees, 14,327 graduate degrees and 819 doctoral degrees, and have an average of more than 16 years of acquisition experience. The vast majority—98.3 percent—of the force is certified to exacting Defense Acquisition Workforce Improvement Act standards for proficiency in his or her field, or is within the 24-month grace period and working toward certification goals for their positions.

Clearly, our acquisition professionals have amazing stories to tell. So, gather your ideas and tell your story of how AAWHonorsTheOath in service to our Army and the nation. The deadline for submissions is July 24; please send them to usarmy.pentagon.hqda-asa-alt.list.communications@mail.mil.



How do you **HONOR** the **OATH** of office each day?

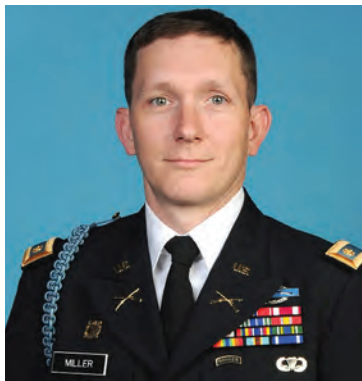
As members of the Army Acquisition Workforce, we began our careers by taking an oath to support and defend the U.S. Constitution. That oath serves as a reminder of our duties and responsibilities in service to our country.

As federal employees, we are all connected by this oath. No matter our role in government–military or civilian—we share this unique and significant responsibility. I know that each of you in the Army Acquisition Corps and the greater AAW work hard every day to honor that oath, and to serve the American people and the Soldiers who defend them.

AAWHonorsTheOath

<http://www.army.mil/asaalt>

GETTING



THE BIG PICTURE

First tour in acquisition yields valuable lessons on capability development.

by MAJ Andrew Miller

When I began my first tour as an acquisition officer, the job seemed simple enough: Meet the approved requirements while balancing cost, schedule and performance. Yet as I complete my first assignment in the Army Acquisition Workforce, I recognize that materiel developers have a much broader role in the Army capability development community than I initially realized. They have a responsibility to partner with the capability developer at every step of the way to help ensure eventual program success.

In this role, I have seen how this partnership, along with inclusive stakeholder collaboration, is essential for successful materiel solutions. Also, I have seen that lasting solutions that will be acceptable to Soldiers must combine nonmateriel and materiel elements—an integrated doctrine, organization, training, materiel, leadership, personnel, facilities and policy (DOTMLPF-P) approach.

This partnership between capability and materiel developers is not a new concept, but its execution is not always effective because of a variety of constraints. The power of this collaborative partnership was evident in my first acquisition assignment as an assistant product manager for the Project Manager for Expeditionary Energy and Sustainment Systems (PM E2S2), assigned to the Program Executive Office for Combat Support and Combat Service Support (PEO CS&CSS).

Initially, I thought the job would be straightforward and largely without friction. I was tasked to develop the Army's next-generation power distribution equipment and had everything I needed to proceed, including approved requirements and funding. My acquisition team had created a schedule that guided the program seamlessly through the life-cycle model from the materiel development decision to Milestone C and beyond, and I saw no reason that we wouldn't be able to meet it. But my optimism flagged when I was tasked to jointly develop power distribution equipment with other services to yield a DOD standard. I immediately saw many of the challenges that I had previously overlooked.

CHALLENGES AND ACHIEVEMENTS

As chair of the Joint Standardization Board for Mobile Electric Power Systems' Power Distribution Working Group (Power-DWG), I was tasked to work with the services to combine four distinct power distribution families of equipment into one. Neither I nor the other Power-DWG members were sure that we could accomplish this, and many doubted that the initial collaborative attempts would succeed. However, as the team worked together and identified a potential joint path forward, this reluctance gave way to a sense of problem ownership and pride in our efforts.

The Power-DWG identified and addressed several major obstacles that threatened to derail the collaborative process. Unfortunately, those obstacles reside chiefly within the Army.

Our key finding was that the Army's development of power distribution requirements was largely sequential and lacked integration between nonmateriel and materiel efforts.

Through the collaborative work of the Power-DWG, which is totally consistent with Army policy, recent senior leader guidance and industry best practices, the Army and other services are now in a position to benefit from collaborative efforts to create a solution that meets our Soldiers' and service members' needs.

LESSONS LEARNED

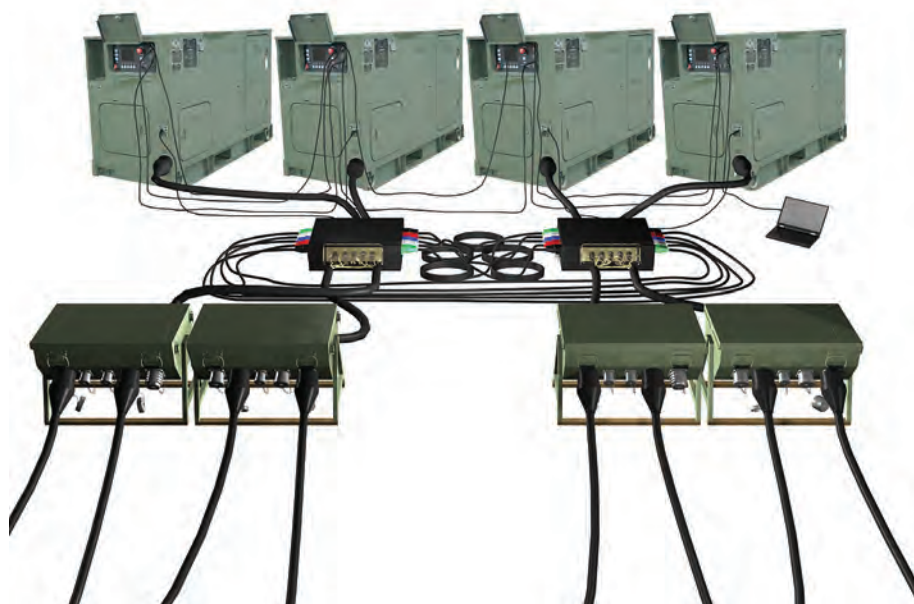
My work with the Power-DWG was a learning experience. Of the numerous lessons I learned, two stand out as key: the necessity of integration across multiple disciplines and the importance of integrating all DOTMLPF-P elements. Specifically:

Integrated capabilities development teams of personnel from multiple disciplines must be the ones to determine and develop capabilities, in accordance with joint and Army regulations and policy. This doesn't mean that every such effort requires a formal integrated capability document team (ICDT) chartered by the Army Capabilities Integration Center (ARCIC), but the integrated team and functional outcomes should form the framework for every new endeavor.

The importance of developing partnerships was the most valuable lesson I learned during my first year as an acquisition officer.

IN NEED OF INTEGRATION

An analysis by PM E2S2's Power-DWG of the Army's nonmateriel power management construct found that the Army lacked the ability to fully integrate advanced power technologies, such as this Advanced Medium Mobile Power Sources microgrid, because, in part, of the fact that the Army's nonmateriel power management construct does not support trained power managers who can plan, employ and operate advanced power systems. (Image courtesy of PEO CS&CSS)





AMPING UP SOLUTIONS

This Power Distribution Illumination System Electrical provides reliable, quick-to-assemble power distribution equipment that is critical to deploying tactical electric power grids. Adjusting DOTMLPF-P factors will improve the Army's ability to exploit advanced power generation, management and distribution systems in the future and facilitate a joint power distribution solution. (Image courtesy of PEO CS&CSS)

Establishing strong partnerships up front helps to identify potential problems before they become significant enough to derail the program. I saw multiple efforts fail due to unanticipated issues that surfaced when new stakeholders entered the requirements development process late in the planning phase.

The Power-DWG membership and participation successfully replicated the organizational and functional aspects of an ICDT. A true interdisciplinary team, it included both materiel and capability developers from each service as well as representatives from the science and technology community. It also sought input directly from users to fully understand the operational environment and constraints. The mix of talent and expertise within the group drove it to look at

power distribution holistically and identify its undeniably close linkage to power management.

While the Power-DWG initially focused only on developing a joint materiel solution, it quickly determined that it would be foolish to recommend a materiel solution without recognizing and addressing inconsistencies in service power management concepts and the resulting approach to power distribution. The Power-DWG found that the Army's position regarding power management was an outlier compared with that of the other services.

Capability requirements must have fully integrated DOTMLPF-P solutions. Stand-alone materiel solutions often are destined to achieve only limited gap mitigation or fail outright. Silver-bullet solutions that solve a problem by addressing only one element of DOTMLPF-P are rare. Almost always, a combination of DOTMLPF-P considerations must accompany any successful materiel development effort.

As the Power-DWG continued its efforts, members discovered that the core challenge to power distribution was related to the services' differing understandings of and approaches to power management. We worked together to define what power management was, who performed it and how each service approached it. The Power-DWG ultimately identified a working definition for power management, the elements of which allowed for service-based comparisons that illuminated the Army's status as an outlier. This outcome was also a direct result of Power-DWG's multidisciplinary membership and partnership approach to the problem.

Analysis of the Army's nonmateriel power management construct found that the Army lacked the ability to adopt common

power distribution equipment, and that the reason for this was rooted in a much larger power management problem. The team also determined that the Army's approach to power management did not consider the complexity of current or future tactical electric power systems.

Based on their current approach, Army units do not have organic power managers with the training and experience to effectively employ today's power systems. The Army should anticipate that this issue will grow more pronounced with the adoption of more complex power systems. The Power-DWG also determined that if the Army doesn't update the nonmateriel aspects of its approach to power management in the areas of doctrine, organization, training and personnel, it will not be able to fully integrate advanced power technologies, reduce sustainment demand and achieve the logistics-based savings called for in the Army operating concept, "Win in a Complex World." This includes the advanced distribution equipment that the Power-DWG initially evaluated.

As the Power-DWG researched recommendations, it discovered that the problem had several layers of complexity. For starters, nonmateriel power distribution issues span several U.S. Army Training and Doctrine Command (TRADOC) centers of excellence that have an interest in power management, although interests and efforts are not always coordinated. Furthermore, the Power-DWG discovered that these issues were not new; most have been clearly identified in multiple requirements documents, DOTMLPF-P analyses and numerous reports from TRADOC, ARCIC, the U.S. Army Materiel Systems Analysis Activity and independent organizations. Through research, the Power-DWG determined that although

the power management issues have been widespread and clearly articulated, they were not comprehensively addressed or resolved because no single organization “owned” the issue.

The Power-DWG’s recommendation includes Army-specific adjustments to DOTMLPF-P domains that will not only facilitate a joint power distribution solution, but will also improve the

Army’s ability to exploit advanced power generation, management and distribution systems in the future. The team’s nonmateriel recommendations also reinforce the importance of an integrated DOTMLPF-P solution, rather than simply a technology acquisition.

CONCLUSION

As an Army officer, I have come to understand that the prescribed approach

to capability development is not always strictly followed. Personnel and organizations generally understand the benefits of close partnerships between stakeholders in the materiel and capability worlds; however, they too often allow conflicting priorities and limited resources to get in the way. Army leaders recognize the importance of this integration and often challenge organizations to strive for it.

GEN David G. Perkins, TRADOC commander, and LTG H.R. McMaster, ARCIC director, recently reiterated the need for this collaboration in the capability development process, to include all key stakeholders, program executive officers and project managers alike. Finally, as is often the case, the Army can apply lessons learned from industry, whose best practices reinforce early collaboration in the design process. A common example of an industry tool for early collaboration is use-case development. This process maps and analyzes the end user’s interactions with the system, ensuring that end users’ needs are represented and planned for early in the development process.

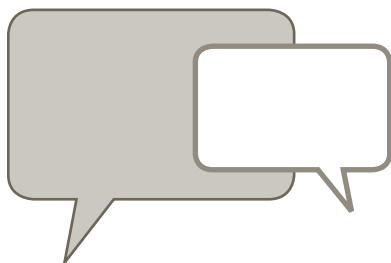
The Power-DWG continues to meet and find the best systems acquisition approach to power management—one that balances cost, schedule, performance and the needs of the services.

MAJ ANDREW MILLER is a former infantry officer completing his first tour as an Army acquisition officer. He is currently assigned as an assistant product manager for large power sources under PEO CS&CSS’ PM E2S2, Fort Belvoir, VA. He holds an MBA from Southeastern Louisiana University and a B.A. in business administration from Louisiana State University.



MULTIPLE CHALLENGES

PM E2S2’s Power-DWG found that the Army has well-documented nonmateriel challenges that affect its ability to effectively manage power. The result: Army units often lack organic power managers with the training and expertise to effectively employ today’s power systems. (Photo courtesy of PEO CS&CSS)



COMMUNICATING DECISIVELY:

12 Steps to a Successful Briefing

Some people are natural public speakers with all their facts and persuasion easily at hand, and then there are those who are not, but would prefer to walk out of a briefing with their senior-leader audience informed and their dignity intact. The author has created his own 12-step program for doing just that.

by MAJ Loren D. Todd

I am a recovering terrible briefer. There, I said it.



Briefing is easier for some of us than others. A lucky few seem to be born “Toastmaster-ready,” as a great program director once put it. Others, like me, do not brief well if they don’t prepare meticulously. I’ve been an assistant product manager (PdM) in Program Executive Office for Missiles and Space (PEO MS) for the last two years, and my chain of command has allowed me to deliver several briefings at the PEO level for my professional development. During many of those briefings, I did not communicate effectively: I talked too fast, stumbled over my words, got off message, answered questions no one asked and tried to inject humor at the wrong time. My one saving grace was that I knew the details of my program well enough to get the basic points across; for that alone, I presume, my chain of command was willing to let me try again. Over time, though, I realized that if I didn’t want to erode my credibility, I had to change the way I was preparing.

A few months ago, I finally got it right in a briefing I prepared and delivered to the Army acquisition executive (AAE). This was an event too important to leave to my shoot-from-the hip

Include in your kitbag of ready answers a well-worn phrase that will save you the pain and agony of a flummoxed or incorrect response to unexpected questions: “I don’t know, ma’am (or sir), but I’ll get you an answer.”

style. My chain of command led me through the process from preparation through execution, and I’m happy to report that the briefing, which was critically important to my program, was successful. I took notes, added some lessons learned from steps in the process that didn’t go perfectly, and codified the “12-step program” below. I’m hoping that it will help captains and majors new to the Acquisition Corps avoid my mistakes.

Although that briefing to the AAE went very well, a few weeks afterward, I delivered another briefing to the PEO and skipped a few of these steps—with unfortunate results. I recognize now that I will never fully graduate from this 12-step program. Those of us who are new to the acquisition workforce need to prepare ourselves methodically and deliberately to communicate with senior acquisition professionals as we learn processes and terminology that are foreign to us. So, as much as I want to share my ordeal with my fellow majors and captains, I also wanted to write this for myself. I will always be a recovering terrible briefer. But I have confidence that if I use this process as a guide and prepare myself thoroughly, I can deliver a professional briefing to anyone, communicate decisively and give myself better than even odds at getting a favorable decision—and so can you.

STEP 1: ADMIT THAT YOU HAVE A PROBLEM.

Have you ever wondered after a briefing if you communicated well or not? If the person you briefed really understood what you were trying to say? If the other staff officers in the room deliberately avoided eye contact because your briefing style was so bad that you embarrassed yourself? If the answer to any of these questions is “yes,” odds are that the briefing was not good, and you did in fact embarrass yourself. If you suspect that you’re not a good briefer, you’re probably not. If your chain

of command tells you that you need to work on your briefing skills, you have a bigger problem than you thought. Skip the denial, anger, bargaining and depression and go straight to acceptance. Once you’ve come to terms with the fact that you need to work on your briefing skills, get better. This process helped me to improve.



STEP 2: FIGURE OUT WHAT YOUR MESSAGE IS, WHAT DECISIONS YOU WANT AND WHAT THE “ARC” OF THE BRIEF SHOULD BE.

Then build the draft slides. The first movement of a symphony follows a standard format: exposition, development and recapitulation. The theme

is presented up front, explored thoroughly in the middle, and repeated at the end. While I recognize that briefings are not exactly Beethoven, the same logical structure applies. Figure out what the central message (theme) and supporting points are and state them up front along with any decisions you want (exposition). Show the data supporting the message and decision in the middle, and then repeat the message and ask for the decision at the end (recapitulation). Build a breadcrumb trail of logic from the introduction through the data to the conclusion. Figure out what you want to say first, then create some initial rudimentary slides to allow you to adjust fire. Print the slides and lay them out and, with the help of your chain of command, put them in a logical order. Bring in a contrarian—someone to play the red team—to find holes. Finally, build on the rudimentary slides to create a suitable initial draft.



STEP 3: COORDINATE THE SLIDE DECK WITH STAKEHOLDERS, THEN COMPLETE THE DECK.

Who else has a stake in what you’re briefing? The capability developer? The Army Test and Evaluation Command (ATEC)? The Army Contracting Command? Once your chain of command

has approved the draft slides for release, send them out for comment to the appropriate stakeholders. After you have adjudicated the stakeholders’ comments, complete the deck, ensure that it’s visually appealing, and get the chain of command’s approval. Be sure to highlight any areas of dissent and explain why, in your considered opinion and based on the relevant facts, the decision should be made anyway.



STEP 4: BEGIN WRITING THE SCRIPT. Yes, you need a script. No, you shouldn't read from the script with your nose buried in the page when you're briefing. Since you've already ensured your presentation is coherent and logical, figure out the appropriate talking points for each slide. What is the point of each slide? Why is it in the deck? Boil it down to the minimum number of words with minimal jargon required to get your point across in a way that cannot be misunderstood. Your voice track should stick to the subject matter on the slide at hand, but you should not simply read the bullets on the slide verbatim; doing so conveys to your audience that your knowledge of the subject is only PowerPoint deep. Plus, it's boring. The slide and the talking points should complement each other. Be sure to build a bridge to the next slide.

STEP 5: REVIEW THE SLIDES AND VOICE TRACK WITH SUBJECT MATTER EXPERTS AND YOUR IMMEDIATE CHAIN OF COMMAND. This is the last step in completing the briefing package. The intent is to make sure the briefing—slides plus narration—works as a completed product.



STEP 6: "MURDER BOARD" YOUR ANSWERS. While you're reviewing the completed slide deck with your chain of command, be

sure to run through anticipated questions and develop appropriate answers. Include in your kitbag of ready answers a well-worn phrase that will save you the pain and agony of a flummoxed or incorrect response to unexpected questions: "I don't know, ma'am (or sir), but I'll get you an answer." I've found many times in briefings that I knew my subject matter well, but I had trouble answering questions concisely and decisively without melting into a molten flow of meaningless jargon. No one is impressed with jargon in briefings if it doesn't help the audience to understand the point you're trying to make. People who are actually smart don't try to sound smart; they strive to explain complex ideas simply in a way anyone can understand.

STEP 7: FOR BRIEFINGS THAT INCLUDE STAKEHOLDERS, IDENTIFY "LANES" FOR ANSWERING QUESTIONS, THEN MURDER BOARD THEIR ANSWERS. Many senior-level briefings will include stakeholders. Identify exactly who will participate in the briefing and include them in the murder board. For instance, any questions about a system's requirements should be answered by the capability developer. Any questions about test results should be answered by ATEC and so on. As a rule, you, as the primary briefer, should not answer questions outside of your lane even if you know the answer unless the organization who "owns" the lane is not present.



STEP 8: REHEARSE. This is the connection between preparation and execution. Just like an orchestra conductor before a concert or a platoon leader before a deployment, you need to adequately rehearse, both by yourself and with your team. Rehearse your script until you only have to glance at it to keep yourself on track.

Bring the stakeholders you included in your murder board back for your team dress rehearsal. This may seem redundant, but it will ensure that the talking points and answers to questions generated during the murder board "stuck." Honestly, including stakeholders in murder boards and rehearsals was not something I did well before the AAE brief, and I made a note to do a better, more deliberate job the next time. I was fortunate that the stakeholders were excellent briefers who knew exactly the right things to say.

STEP 9: WHEN YOU DELIVER THE BRIEF, STICK TO THE SCRIPT. Do it just like you practiced. No ad libbing. During one of my prebriefs to a general officer leading up

to the AAE brief, I mistakenly thought I could make the briefing better by going off script to explain the finer points of radar waveforms. Not only was this a topic that I didn't have expert mastery of, but whatever point I was trying to make didn't come out coherently. At one point, I asked the general if I was making myself understood. He said simply, "No."



STEP 10: DELIBERATELY SLOW DOWN. Since you've thoroughly rehearsed, there's a good chance you'll talk too fast. Slow down. One trick is to record yourself talking on the day of the brief once the adrenaline has started flowing, then play the recording back to yourself. If you hear yourself talking too fast, record

yourself again, making a conscious effort to speak more slowly. Repeat the process until the cadence of your recorded speech sounds normal. Remember how that feels. Once the briefing starts, silently count to three between sentences as a continuous reminder not to rush.



STEP 11: STAY ON MESSAGE WHEN ANSWERING QUESTIONS DURING THE BRIEFING. This goes hand-in-hand with Step 7, 8 and 9. When you answer questions, stay on the basic path you've laid out for yourself. Don't go breaking new trails. Bridge back to the central talking points. If

you feel like you're under fire, you may try to seek comfort in topic areas with which you're comfortable, but that may divert from the message. For example, I have a habit of seeking cover in the weedy, thorny defilade programmatic details, regardless of whether those details are relevant to the discussion. Avoid these kinds of traps. If you've done adequate preparation in the murder board, this should not be a problem.



STEP 12: PLAY IT STRAIGHT. If you, like me, tend to try to defuse tense situations with humor, don't. Humor rarely has a place in professional briefings, and a bad joke can damage your credibility. Play it straight. Deal with the pressure, and save the jokes for a more appropriate setting.

CONCLUSION

The briefing went well, didn't it? Pat your team and yourself on the back, then refer to Step 1. After the brief to the AAE, I mistakenly thought that my briefing skills had made the brief successful. They did not. The process, not to mention the massive input from my team, made the briefing successful.

Though all of this preparation takes a lot of time and effort, the end result is a polished, professional product. And here's the great thing: No one will ever know you're not one of those Toastmasters guys. All they'll know is that you're a great briefer. And the more briefings you deliver, the more your success will build on itself. Practice will make you better, whether you're a piano player learning a sonata or an Army major learning to speak the foreign language of defense acquisition. But it's not just practice that matters. It's practicing the right way. That's why I'm sticking to the 12 steps and I'd recommend that you do, too.

For further information contact the author at loren.d.todd.mil@mail.mil.

MAJ LOREN D. TODD is the assistant PdM, Radars for the AN/TPQ-53 counter-fire radar. He holds an M.A. in management and leadership from Webster University and a B.A. in English from Central Washington University. He has been a part of the Army Acquisition Workforce since 2010 and is Level II certified in test and evaluation and Level II certified in program management.

Although that briefing to the AAE went very well, a few weeks afterward, I delivered another briefing to the PEO and skipped a few of these steps — with unfortunate results. I recognize now that I will never fully graduate from this 12-step program.



OUTSIDE THE BOX

ON A MISSION

The CERDEC Night Vision and Electronic Sensors Directorate and the Product Manager for Assured Mobility Systems rapidly developed the Multifunction Video Display, a software and hardware architecture that distributes images and sensor control to all crew stations within the MMPV Type II, shown here performing roadside threat interrogation activity. (Photos and images courtesy of CERDEC)





MANY EYES, SAME PICTURES

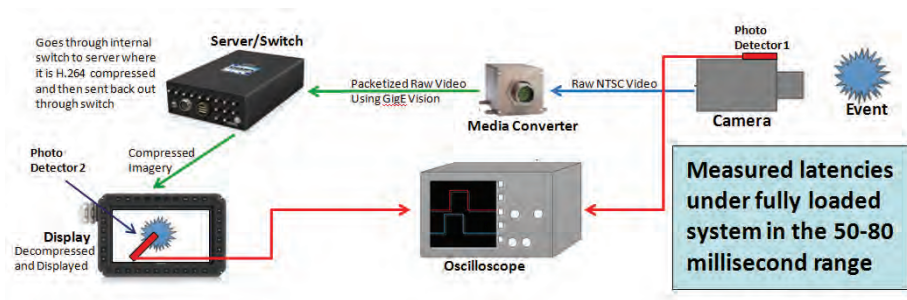
Multifunction Video Display system demonstrates the first fully government-owned package of software and hardware that can display full-motion video from all vehicle-enablers at all crew stations within the Medium Mine Protected Vehicle Type II. Providing all crew members access to all sensors, the system improves operator efficiency and situational awareness and reduces size, weight and power requirements.

by Mr. Sean Jellish and Mr. Brian Wilson

A crew of four combat engineers is buttoned up in a Medium Mine Protected Vehicle (MMPV) Type II, moving down the road in search of suspected explosive hazards, with a mission to ensure that the route is safe for a convoy to travel. Each crew member has a set mission and, other than the driver, each is most likely using an enabler or sensor to help find the hazards. Each Soldier can only see what that sensor displays, requiring him or her to alert the rest of the team to what they see. But wouldn't it be better if the rest of the team could see that information too, rather than just hear about it? Wouldn't it be better to tie all these sensors together, to give the truck commander all the information his crew has so that he can make decisions quicker and with more confidence?

With the evolution of the improvised explosive device threat, the Army has seen a proliferation of independent control systems in the route clearance MMPV Type II crew compartments. These "vehicle enablers," such as imaging sensors, weapon systems and





SPEED TEST

To test for system latency—the delay between input and outcome—an oscilloscope compared the speed of the signal as measured directly from the initial event with raw video processed through the camera, media converter, server and display. Tests indicated that latency under full load was well within required specifications.

communications equipment, come with their own proprietary and unique operator stations, which can be viewed and controlled only by the Soldiers assigned to them. All of these different operator stations limit room for future capability growth and create integration challenges. Even if all the stations could fit in one vehicle, they’d require too many displays for a single operator to view and control effectively.

To address these challenges in the forthcoming MMPV Type II program of record (POR), the U.S. Army Research, Development and Engineering Command’s Communications-Electronics Center (CERDEC), a subordinate organization to U.S. Army Materiel Command, partnered with the Product Manager for Assured Mobility Systems (PdM AMS) to rapidly develop a software and hardware architecture called the Multifunction Video Display (MVD). PdM AMS comes under the Army Project Office for Mine Resistant Ambush Protected Vehicles, assigned to the Program Executive Office (PEO) for Combat Support and Combat Service Support.

The MVD system efficiently distributes images and sensor control to all crew stations within a vehicle, resulting in a single touch-screen display for each crew station capable of viewing and controlling all vehicle enablers, and creating a seamless common interface across all enablers. This allows capability growth without increasing display size, weight and power (SWAP) requirements. Adding a new enabler no longer requires the addition of an enabler operator’s station. MVD technology is completely government-owned and -developed, is hardware-independent, enabling it to run on numerous platforms, and has a plug-and-play VICTORY [command, control, communications, computers, information, surveillance and reconnaissance/electronic warfare] Interoperability)-based architecture. The software can run on any platform.

MULTIPLE EFFICIENCIES

MVD improves mission capability by increasing operator efficiency and situational awareness and reducing SWAP requirements. Operator efficiency improves first by keeping the operator focused on one display that presents

him or her with an identical view of each vehicle enabler from the common user interface all the enablers share. Similarly, the training burden is reduced with consistency across operator controls. The operator has only one interface to learn and a common set of controls for all enablers, now and into the future.

Previously, full-motion video could only be viewed by a single crew member with the enabler’s dedicated display. With MVD, any crew member can view video from any or all enablers simultaneously and in real time. With additional eyes on each video feed, situational awareness increases proportionally. Finally, the single integrated MVD system obviates the need for dedicated processing and display hardware, reducing SWAP requirements.

AGGRESSIVE TIMELINE, AGGRESSIVE PLAN

The MVD project originated in a conversation between the CERDEC Night Vision and Electronic Sensors Directorate (NVESD) and PdM AMS at a forum hosted by the U.S. Army Engineer School related to capability production document (CPD) vehicle requirements for the MMPV Type II POR. The overall CPD required a common, intuitive display to view and control all vehicle enablers at all crew stations simultaneously in real time, with the capacity for future growth. NVESD had accomplished a related display effort called Multi-sensor Graphical User Interface, which could be augmented to meet that MMPV Type II single display requirement. The timeline for development was aggressive as the result of the MMPV Type II fielding schedule.

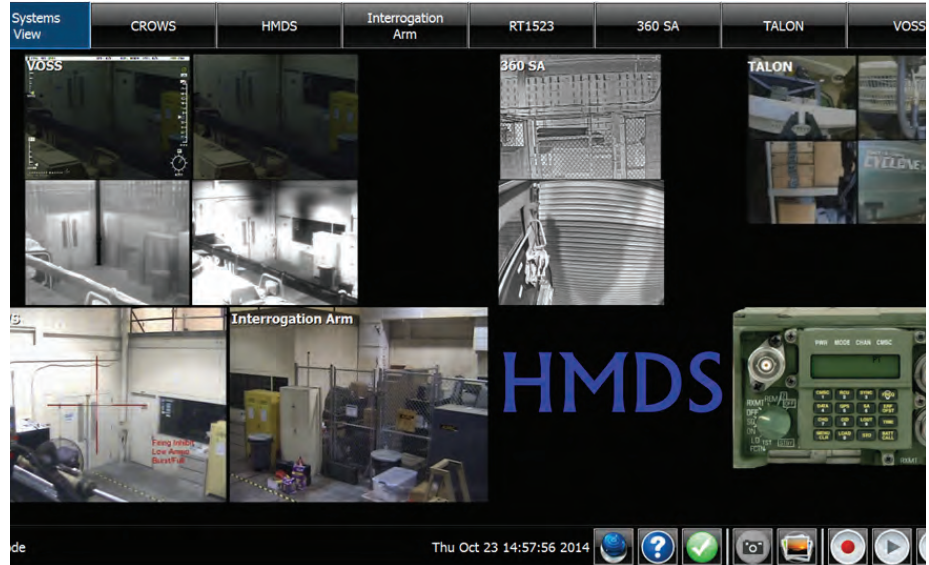
To be considered for insertion into the MMPV during its U.S. Army Test and Evaluation Center testing (currently ongoing), NVESD and PdM AMS had to demonstrate a working prototype system

within six months, followed quickly by a six-month prototype refinement period to create a more ruggedized version.

As a first step, NVESD conducted an architecture study to determine how best to meet the overall project goal. NVESD identified three target system architectures. NVESD designed the software prototypes for each architecture and collaborated with hardware vendors to design the hardware prototypes that would demonstrate the architectures. Common to each approach was the need to convert the MMPV Type II legacy analog camera data to digital and then fit the data into the available bandwidth for each display. The aggregate bandwidth of all the different vehicle-enablers is roughly three times more than most common commercial off-the-shelf interfaces can handle.

The three architectures varied mainly in where they collected imagery and how they disseminated it to the displays. A centralized architecture collected the images at a central server with dedicated image-capturing hardware that compressed the imagery and sent it out to the displays. A distributed architecture had image-capturing hardware in each display to capture a subset of the images, which it compressed and passed to the other displays. A network-centric approach used stand-alone media converters to capture the imagery and a server switch to compress it and send it to the displays.

The network-centric architecture was deemed the best of the three. It has ample hardware redundancy to survive various kinds of hardware failure as opposed to the centralized approach, which would be crippled by the failure of the central server. It minimizes the number of components required in the displays, keeping them thin and light for rapid vehicle ingress



EYES EVERYWHERE

The graphical user interface of the MVD system establishes a common monitor and interface to view and operate many simultaneous real-time video feeds. The system can also act as a digital video recorder, allowing for the capture and playback of video sequences and snapshots.



MOVING INTO FOCUS

An MVD plug-in enables use of high-magnification sensors, which means that crews can perform roadway and roadside threat detection at extended ranges while on the move.

and egress. And, as the vehicle shifts away from analog sensors, the media converters can be removed and new digital sensors can tap directly into the server switch. Finally, this approach conforms to the Army's move toward network connectedness with the introduction of the VICTORY standard for communicating between systems within a vehicle and the Integrated Sensor Architecture (ISA) for sharing information between sensors and systems in a tactical environment.

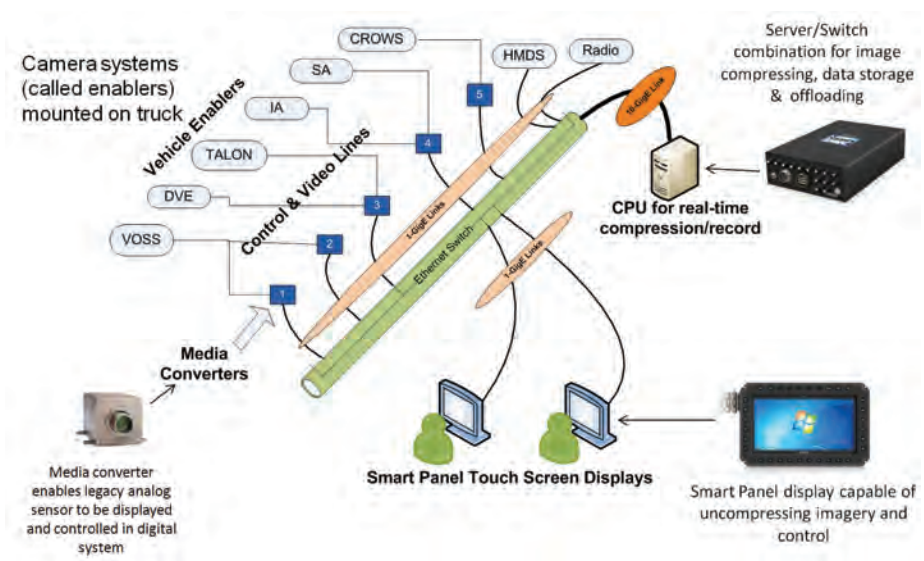
Over the course of the MVD system development, NVESD worked closely with multiple hardware vendors to transition each of the system architectural components from laboratory-grade prototypes to full military standard, conduction-cooled, production products capable of operating in the extreme environments of the MMPV Type II at minimal cost.

DELIVERING THE SYSTEM

The evolution of the system server switch set the stage for the entire MVD procurement strategy. After completing the initial system demonstrations, it was time for the ruggedized solution. While researching similar hardware acquisitions on other government projects, NVESD found that the ruggedized servers used by the Project Manager for the Warfighter Information Network – Tactical (PM WIN-T) met the needs of MVD almost perfectly. PM WIN-T, assigned to the PEO for Command, Control and Communications – Tactical (PEO C3T), was purchasing its servers using the Common Hardware Systems 4 contract of PEO C3T's PM for Mission Command, a contract open to all DOD customers to procure tactical hardware and services. PdM AMS is testing this procurement mechanism, which would greatly reduce the time necessary to purchase hardware, for use with MVD.

A PATH FOR GROWTH

The MVD software is hardware-independent and operates on any of the three architectures with minor modifications. MVD design is novel in that it uses a modular plug-in-based architecture, which means that new enabler systems can be added without modifying or recompiling any of the existing code. This is a tremendous cost savings as the hybrid threat is continuously adapting to defeat-strategies, requiring new vehicle-enablers. MVD software comprises many thousands of lines of code that government personnel at NVESD authored quickly to meet the aggressive development schedule. The code has been through multiple rounds of static analysis as well as code coverage testing to ensure that every line operates as intended without errors. In addition, a mobile platform version of the system for Android devices will allow an operator to continue using enablers while dismantled from the vehicle.



PUTTING IT TOGETHER

The system architecture used in the MVD system provides robust, distributed processing for redundancy, speed and room for future growth without the need for costly reconfigurations.

The system uses industry standards for interfaces and data formats, including both VICTORY and ISA, enabling it to communicate with current and future systems internal and external to the vehicle platform. Along with image display, the MVD system can also act as a digital video recorder, allowing for the capture and playback of video sequences and snapshots. The MVD system currently allows for the full control of several of the MMPV Type II enablers and display of nine separate camera feeds. The system has demonstrated robustness in testing with 14 full-motion video feeds captured simultaneously and displayed in real time—nearly five times more enabler feeds than any single configuration of a typical MMPV Type II platform. This is the key demonstration that provided the assurance PdM AMS needed to select the MVD system as the display solution for its MMPV Type II POR.

With all enablers viewed and controlled through MVD and plenty of processing headroom, MVD has great potential for future growth into previously unreachable areas that use a number of separate enablers. For example, MVD contains a plug-in that can slew a high-magnification sensor to a specific spot simply by touching the wide field-of-view video displayed on another enabler, allowing operators to perform roadway and roadside threat detection at extended ranges while moving. MVD can also transform the outputs of all enablers into the same geospatial coordinate system and has the processing power to perform detection and tracking algorithms on them, which means it can be used algorithmically to aid operators in detecting threats.

CONCLUSION

With the multiple improvements it represents in capability, as well as the built-in processing headroom that provides for future capability growth, MVD was PdM AMS' natural choice to be the display system in the MMPV Type II POR. It will improve communication within the MMPV Type II vehicle crew and decrease the time spent searching for suspected explosive hazards, allowing route clearance teams to become more efficient while keeping them safer when performing their mission.

This system has the potential to tap into many of the combat developers' future capability production document programs and tie them together while improving the way that route clearance will be done in the future. The stovepiped method of adding new capabilities and sensors is gone, replaced by the "tablet-like" capability of the MVD. The benefits of the MVD system don't stop there, either; MVD has the potential to affect all DOD ground vehicles with sensors by acting as the operator's display, thereby



TIGHT QUARTERS

The current crew station includes separate displays for each of the enablers in use, including imaging sensors, weapon systems and communications equipment, limiting room for future capability growth and creating integration challenges.

achieving substantial SWAP reductions and saving money.

For more information, please contact Sean Jellish (sean.m.jellish.civ@mail.mil) or Brian Wilson (brian.j.wilson90.civ@mail.mil)

MR. SEAN JELLISH is the lead engineer on the MVD program at NVESD, Fort Belvoir, VA. He specializes in algorithm development, embedded processing, hardware and software architectures and mobile programming. He has an M.S.

in electrical engineering and a B.S. in computer science and electrical engineering from the University of Virginia. He is Level III certified in systems engineering and is a member of the Army Acquisition Corps.

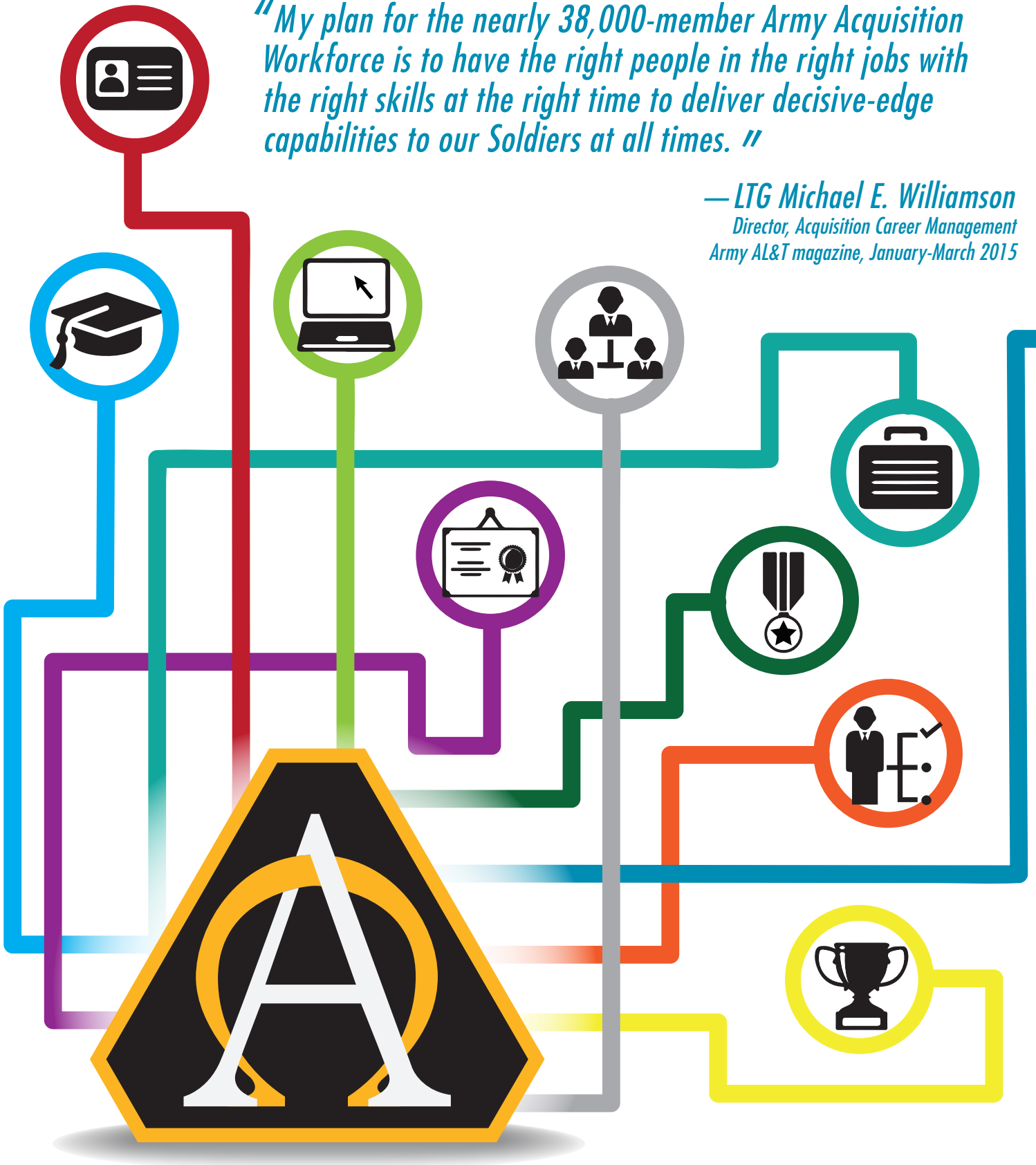
MR. BRIAN WILSON is the engineering team leader for the system integration of route clearance vehicle enablers at PdM AMS. He holds an M.S. in engineering management from the University of Michigan and a B.S. in mechanical engineering from University of Detroit Mercy. He is Level III certified in systems engineering and is a member of the Army Acquisition Corps.



WORKFORCE

“My plan for the nearly 38,000-member Army Acquisition Workforce is to have the right people in the right jobs with the right skills at the right time to deliver decisive-edge capabilities to our Soldiers at all times.”

*—LTG Michael E. Williamson
Director, Acquisition Career Management
Army AL&T magazine, January-March 2015*





Paths to LEADERSHIP



New civilian product directors discuss career paths to their selection.

by Army AL&T staff

As the director of Army acquisition career management (DACM), LTG Michael E. Williamson presided over the first-ever product director centralized selection board for civilians in December at Fort Knox, KY, which resulted in the selection of a pool of candidates to become new product directors. In February, Williamson presided over a talent management board of directors, which included Deputy DACM Craig A. Spisak and the 12 program executive officers (PEOs), to approve positions for members of that talent pool.

Williamson has made no secret of his emphasis on talent management since becoming DACM in April 2014. Indeed, said Diane Murtha, chief of concept and policy development in the DACM Office at the U.S. Army Acquisition Support Center, he “arrived as DACM with talent management of both our civilian and military acquisition workforce members as his top priority. His goal,” she continued, “is the development of a pool of the right people with the right skills for the right jobs. The product director pilot is our premier initiative to support this. The first-ever central management of civilian-only product directors is the core of the civilian talent management pilot concept.”

Army AL&T magazine reached out to the DACM Office and a selection of the new product directors because, as we continually survey our readers, one thing we hear consistently is the desire for more career-oriented articles. We also thought it would be

fascinating to look into the career trajectories that help people gain experience, challenge themselves and grow as acquisition professionals.

We wanted to know how some of these new, civilian product directors got where they are. Did they avail themselves of training and educational opportunities? What kind of degrees do they have? Were mentors a factor in their work lives? Were their career paths by the book, or were their routes to the new positions more circuitous? How can others learn from their examples?

For some, their careers have very much mirrored Williamson’s Program Management Career Model for civilians. Others, not as much. Many of these civilian product directors have military backgrounds, and many said that mentors played important roles in their careers. All are extremely well-educated.

There are, apparently, multiple ways to get to essentially the same place.

“The sustainment of our Army Acquisition Corps [AAC] depends upon the investment we make in our professionals today,” said Williamson in a video highlighting what talent management means to the Army Acquisition Workforce. Herewith, the results of some of that investment.





ANTHONY BUDZICHOWSKI

POSITION:

Joint Biological Tactical Detection System, Joint Program Executive Office for Chemical and Biological Defense, Aberdeen Proving Ground, MD

CERTIFICATIONS:

Level III in program management; Level III in engineering

EDUCATION:

M.S. in global leadership and management, Lawrence Technological University; B.S. in chemical engineering, Lehigh University; Advanced Acquisition Program Certificate, Naval Postgraduate School; Defense Acquisition University Senior Service College

YEARS IN ARMY ACQUISITION WORKFORCE: 6

AAC MEMBERSHIP: Yes

Please describe briefly your career path. In what ways did it resemble or not resemble the Program Management Career Model?

I'd say that my career path followed the Program Management Career Model rather closely, with the caveat that the first 25 years of my civil service career were with the Navy. I started my civil service career in 1985, as a mechanical engineer with the Naval Air Engineering Center in Lakehurst, NJ. From there, I was competitively promoted into a position supporting the Naval Sea Systems Command in Washington, DC, where I served as an engineering manager in the Shipboard Environmental Protection Division. From there, I was promoted into a senior leadership position as the director of the Shipboard Environmental Systems Engineering Division. I moved to the Army in mid-2009, accepting a program management position and also served as program management division chief with Project Manager Night Vision/Reconnaissance, Surveillance and Target Acquisition, part of the Program Executive Office for Intelligence, Electronic Warfare and Sensors, at Fort Belvoir, VA. I started in Army Acquisition because I was looking to broaden my experience after reaching the top of

my technical organization in the Navy. I completed Military Education Level 1 of the Senior Service College Fellowship program, and earned my M.S. in 2014.

What do you think was the single most important thing you did to get where you are today?

I think hard work and my willingness to apply for new opportunities that stretched and challenged me professionally were factors in getting me where I am today.

Did a mentor or mentors (or being a mentor) make a big difference in your career advancement? If so, how?

One mentor in particular—Ms. Ye-Ling Wang with the Naval Sea Systems Command—made a big difference by encouraging me to apply for a promotion that required relocation, helping me to focus on developing new leadership skill sets and showing the benefits of reaching for opportunities out of my comfort zone.

Were there career-broadening experiences that helped in a critical way?

I'd say that the entire journey from junior engineer to senior acquisition

professional was critical. Each experience stretched me and improved my technical and leadership abilities. It's a long road that requires patience.

What has been your biggest surprise as a member of the Army Acquisition Workforce?

The professionalism and dedication of the Army Acquisition Workforce and the vision of senior leadership to provide educational and leadership development opportunities for the Army civilian workforce.



BACK TO CLASS

Anthony Budzichowski's career included a session at Senior Service College in April 2014. Attending with Budzichowski, far left, are Jack Spielman, Professor Jamie Hsu from Lawrence Technological University, Debbie DiCesere, John Engbloom and Marta Tomkiw. (Photo courtesy of Anthony Budzichowski)



TIM VINSON

POSITION:

Aviation Networks and Mission Planning, Program Executive Office for Aviation, Redstone Arsenal, AL

CERTIFICATIONS:

Level III in program management; Level I in business-financial management and life cycle logistics

EDUCATION: MBA and B.S. in business administration, New Mexico State University

YEARS IN WORKFORCE: 21

AAC MEMBERSHIP: Yes

Please describe briefly your career path. In what ways did it resemble or not resemble the Program Management Career Model?

My 21-year Army career provided numerous leadership opportunities. And within Army acquisition, I was an assistant program manager while on active duty, then an assistant program manager and deputy program manager (DPM) as an Army civilian. My early functional experience positions were operational staff and leadership positions while I was on active duty. Since my first Army civilian assignment as an NH-03 assistant product manager, my training and experience has mirrored the Program Management Career Model.

What do you think was the single most important thing you did to get where you are today?

Military leadership training and experience, coupled with support contractor leadership experience and Army civilian leadership and training experiences all rounded out my knowledge base. DAU PMT 401—the [Defense Acquisition University] Program Manager’s Course—and Senior Service College Fellowship (SSCF) enabled further knowledge growth.

Did a mentor or mentors (or being a mentor) make a big difference in your career advancement? If so, how?

Yes. Mentors encouraged me to apply for a DPM position, to apply for the SSCF and to apply for the product director position. COL Tony Potts [currently deputy to MG Paul Ostrowski, deputy for acquisition and systems management in the Office of the ASA(ALT)] remains a valued informal mentor. During the two and a half years that I worked for him, and in the nearly five years since then, he has continually provided leadership coaching as well as practical insights about the defense acquisition process.

COL Tony Potts remains a valued informal mentor. During the two and a half years that I worked for him, and in the nearly five years since then, he has continually provided leadership coaching as well as practical insights about the defense acquisition process.

Were there career-broadening experiences that helped in a critical way?

My Army experience enabled hands-on leadership, training, operations, logistics and deployment experience.

What has been your biggest surprise as a member of the Army Acquisition Workforce?

Although I entered the acquisition career field with 15 years of Army service, I had no idea about the challenges in navigating a program through the defense acquisition process. There are many stakeholders who get a say along the path to a milestone decision for a program. As [Assistant Secretary of the Army for Acquisitions, Logistics and Technology] Ms. [Heidi] Shyu recently pointed out in her speech at the AUSA Global Force Symposium, on the acquisition accountability bus, the program manager is the driver, but “every single stakeholder ... has a steering wheel and a brake. Notice they have no acceleration pedal.” So, stakeholder relations are an often overlooked, yet incredibly important program management skill.



MICHAEL SWITZER

POSITION:

Cargo Helicopter International Program, Program Executive Office for Aviation, Redstone Arsenal, AL

CERTIFICATIONS:

Level III in program management, test and evaluation, and engineering; Level I in business-financial management, life cycle logistics and contracting

EDUCATION: M.A. in procurement and acquisition management, Webster University; B.S. in computer science, United States Military Academy at West Point

YEARS IN WORKFORCE: Approximately 20. Accessed into the Acquisition Workforce as an Army officer in 1995; became a civil servant in 2008

AAC MEMBERSHIP: Yes

Please describe briefly your career path. In what ways did it resemble or not resemble the Program Management Career Model?

I was accessed into the Acquisition Corps when I was accepted into the Army’s engineering test pilot track and the U.S. Naval Test Pilot School in 1995. I had decided I wanted to be an engineering test pilot and was attracted to the opportunities within the Acquisition Corps and the test and evaluation (T&E) field. I had various T&E assignments in Alabama and Maryland, and then went on exchange to the Royal Air Force in the United Kingdom [U.K.], test-flying various aircraft. While in the U.K., I was selected to be a product manager at Redstone [Arsenal, AL] and transitioned into program management. Upon completion of that assignment, I transitioned into the civil service and was a deputy product manager, product director and business manager until I was selected for my current role: product director for the Cargo Helicopter International Program within Program Executive Office Aviation.

My career path did not resemble the Program Management Career Model for civilians. However, I have walked around the chart in the military for 26 years and now as a civilian for nearly eight. I satisfied the Civilian Education System Advanced Course requirement through the Army Command and General Staff College [CGSC], and I’ve taken the Foundation Course required of all civilians since 2006. The Army provided considerable opportunities for leadership training at every level—lieutenant, captain, major and lieutenant colonel—and I’ve also graduated from the Army Senior Leader Development Course.

As for the acquisition programs, I have completed these both in the military and as a civilian: I took the Acquisition Leadership Challenge Program II in 2012, and completed my master’s degree while at CGSC in the Army Acquisition Corps. I was also in the pilot program for the Acquisition Officer Degree Completion Program while in CGSC.

My assignments varied from the traditional model: My four years at West Point provided me with a lot of leadership and educational training. After commissioning, I did nearly 10 years of operational assignments within aviation, and commanded and led at the platoon and company levels. Then I accessed into Army acquisition and started my assignments in my primary career field, which was T&E. I did that for nearly 10 years and was then selected as a CSL [Centralized Selection List] product manager for an aviation program, never having been an assistant product manager or assigned to a PEO or project office. Once I transitioned to civil service, I started out at the deputy product manager level and did that for nearly three years until I got selected for the Senior Service College Fellowship (SSCF) program. From there, I

I have always attempted to give back from the great lessons learned and examples my coaches and mentors have given me to my workforce and others where and when I can, both in my professional life and in my community.



had my first PD position and then career-broadening assignments as a business manager for two different project offices before being selected for product director.

Bottom line, while my path hasn't been a traditional one, I hit the major end points and achieved the same blocks on the model—just in a much different fashion. My story isn't much different than several of the others in the PD selection group, and I've seen it repeated often among civilians in the acquisition workforce: There's a large portion of our core, matrix and contractor workforce who have a military background or are retired from active duty.

What do you think was the single most important thing you did to get where you are today?

Learned, grew and listened to my coaches, mentors and others in the operational Army as well as the test and program management communities to understand my roles, how to form the right team and how to meet the requirements that we had before us. And in every job, I found a way to influence others and to lead and manage teams that got the outcomes and the results that benefited the Soldier and accomplished our mission as well as the visions of the organizations we were in.

Did a mentor or mentors (or being a mentor) make a big difference in your career advancement? If so, how?

Absolutely! From the early days of NCOs [noncommissioned officers] taking a young second lieutenant under their wings to the professional warrant office pilots to more senior military leaders, I have had coaches and mentors in an informal manner. It was not until I was in the SSCF and the Aviation and Missile Command's Leader Investment for Tomorrow programs that I participated in formal mentorship programs.



TAKING OFF

Michael Switzer, a former test pilot, and his team completed an acquisition for the Army Golden Knights sports parachute team three years ago. From left are Switzer; pilots Ken Breeden and Kelly Caudle; Contracting Officer Kim Gillies and Program Integrator Ken Ols. (Photo courtesy of Michael Switzer)

During my nearly seven years as a DA civilian, Paul Bogosian from PEO Aviation has been a great mentor and role model for me. Without his mentoring, my transition from the military may not have been as smooth. I have always attempted to give back from the great lessons learned and examples my coaches and mentors have given me to my workforce and others where and when I can, both in my professional life and in my community. If everyone focused more on others, our organizations and the world would be better off.

Were there career-broadening experiences that helped in a critical way?

While in special operations, I was on an extended temporary duty assignment that supported developmental flight tests of the MH-47G aircraft and its multimode radar system. I met and worked with military and civilian test pilots and engineers, and that really helped solidify my goal to be Army engineering test pilot. Several other factors

contributed as well, including my exposure to other services and foreign nations and the different approaches to acquisition management and T&E. There are many innovative ways of doing the same business, and sharing lessons learned and other perspectives broadens the options and can lead to better outcomes.

What has been your biggest surprise as a member of the Army Acquisition Workforce?

The professionalism and dedication of our civilian and industry workforce. I knew the military side quite well from my 26 years in the Army. Beginning in about 1993, I really started working with DA civilians and contractor industry partners. Without this team, the Acquisition Corps and the acquisition workforce, would not be able to carry out its mission and support the Soldier as well as we do.



MATTHEW MAIER

POSITION:

Medical Communications for Combat Casualty Care, Program Executive Office for Enterprise Information Systems, Fort Detrick, MD

CERTIFICATIONS:

Level III in program management, engineering, and test and evaluation; National Defense University Chief Information Officer and Information Assurance certificates

EDUCATION:

M.A. in management and leadership, Webster University, anticipated in 2016; M.S. in systems engineering, George Mason University; B.S. in electrical engineering, Virginia Tech. Senior Service College graduate

YEARS IN WORKFORCE: 25

AAC MEMBERSHIP: Yes

Please describe briefly your career path. In what ways did it resemble or not resemble the Program Management Career Model?

I began my civilian acquisition career as an electrical engineer at the Systems Engineering Test Directorate, Naval Air Warfare Center Aircraft Division (NAWCAD) in Patuxent River, MD. I spent six years there, performing test and evaluation of Navy aircraft. From there, I moved to the Naval Air Warfare Center Training Systems Division (NAWCTSD), where I was matrixed to the Program Executive Office for Simulation, Training and Instrumentation (PEO STRI). I spent six years there, developing constructive simulation systems for the Army. From there, I transitioned to the U.S. Army Communications Electronics Command Life Cycle Management Command as a computer engineer, and I served as chief engineer and assistant product manager on several classified efforts. I then moved to the Spectrum Management and Information Technology Division at the Joint Spectrum Center, a field office of the Defense Spectrum Organization. Following that assignment, I served as deputy product manager for Information Warfare, which fell under Project Manager Electronic Warfare within PEO Intelligence, Electronic Warfare and Sensors (PEO IEW&S). I am now working in the System of Systems Engineering and Integration (SOSE&I) Directorate in the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology.

What do you think was the single most important thing you did to get where you are today?

Having a strong breadth of knowledge from different Army acquisition organizations. I served in multiple acquisition programs at PEO IEW&S, PEO STRI and SOSE&I, as well as joint and other service organizations such as NAWCAD, NAWCTSD and the Joint Spectrum Center. I think being board-selected for participation in the Senior Service College program also helped support my career growth.

I began my career in test and evaluation and later on moved to both systems engineering and program management. I was able to support multiple programs of varying ACAT levels in all stages of the acquisition life cycle, from materiel solution analysis all the way through to operations and support.



ALL ABOARD

Matthew Maier, product director for Medical Communications for Combat Casualty Care in PEO for Enterprise Information Systems, second from the right, visited Boeing's CH-47 Chinook plant in Philadelphia, PA, along with other students at the Senior Service College. (Photo courtesy of Matthew Maier)

Did a mentor or mentors (or being a mentor) make a big difference in your career advancement? If so, how?

I would say that informal mentors did indeed influence my career growth and help me make decisions on the education and career opportunities available to me. Mike Whitaker, who I worked with at NAWCAD, was a technical expert and informal mentor. He helped me plan a lot of my early career growth in the Navy's Junior Professional Engineer program, and that helped accelerate my advancement in the acquisition workforce. He was also instrumental in helping me through the process of my first DAWIA [Defense Acquisition Workforce Improvement Act] certification. During Senior Service College (SSC) in 2013-2014, Barbara Panther, the director of the Civilian Human Resources Activity at Aberdeen Proving Ground, MD, was assigned as

my mentor. In addition to providing me with guidance on my SSC senior research project, she also provided a detailed mentoring plan for my career. Together, we planned out a timeline to apply to CSL lists, pursue advanced education and so forth, which helped lead to my selection as a product director.

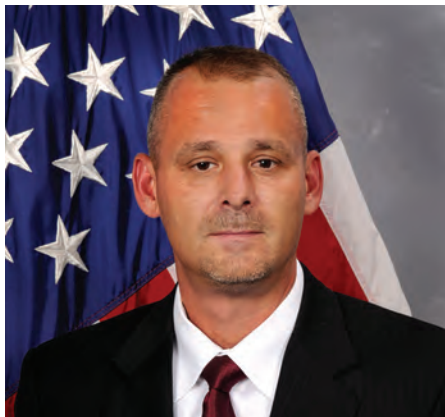
Were there career-broadening experiences that helped in a critical way?

To be selected as a project manager, product manager or product director in the Army, one must have a well-rounded experience base of different aspects of the acquisition life cycle. I began my career in test and evaluation and later on moved to both systems engineering and program management. I was able to support multiple programs of varying ACAT [acquisition category] levels in all stages of the acquisition life cycle, from

materiel solution analysis all the way through to operations and support.

What has been your biggest surprise as a member of the Army Acquisition Workforce?

It was a surprise to me how different the acquisition career tracks are for the military versus civilian workforce. Military officers are not only encouraged to participate in training and education opportunities but are also forced into rotational, career-broadening experiences with increasing levels of complexity. On the civilian side, this is often the result of personal career management and selection into offered programs. It requires significant effort on the part of the DA civilian to ensure competition with military backgrounds and experiences for the same command-selected positions.



ROBERT 'DEREK' LONG

POSITION:

Fixed Wing Special Electronic Mission Aircraft, Program Executive Office for Aviation, Redstone Arsenal, AL

CERTIFICATIONS:

Level III in program management; Level I in contracting

EDUCATION: M.S. in materiel acquisition management, Florida Institute of Technology; B.S. in business administration and law, Western Carolina University

YEARS IN WORKFORCE: Military: 24; Civilian: 4

AAC MEMBERSHIP: Yes

Please describe briefly your career path. In what ways did it resemble or not resemble the Program Management Career Model?

I spent the first eight years of my active-duty career executing a traditional combat arms career path in the Army's Field Artillery Branch, performing duties as a fire direction officer, platoon leader, battery commander and battalion and brigade staff officer. During a two-year assignment with the 188th Infantry Brigade at Fort Stewart, GA, I applied for accession into the Army Acquisition Corps. I was accepted and afforded an opportunity for advanced civilian schooling with the Florida Institute of Technology at Fort Lee, VA, where I earned my M.S in materiel acquisition management. My transition to the Acquisition Corps after company-grade command was consistent with the career path designed for members of the Army Acquisition Corps.

What do you think was the single most important thing you did to get where you are today?

The most important thing I did was to trust in the Lord and do my very best with every opportunity the Army provided me. I trusted my instincts and the

people who worked for me to accomplish the tasks at hand, and placed emphasis on taking care of my Soldiers and the workforce. In return, they have always taken great care of me.

Did a mentor or mentors (or being a mentor) make a big difference in your career advancement? If so, how?

Mentorship is essential to career progression. Learning from those who have gone before you provides incredible insight into what it takes to be a successful leader in today's Army. I have had the great privilege of working for many exceptional leaders who have taken the time to teach me the profession and provide me with invaluable insight into the art of taking care of people and managing organizations. MG Tim Crosby [USA Ret.], formerly the program executive officer for aviation; Rusty Weiger, the deputy PEO for aviation; and COL Mike Cavalier [USA Ret.], the former program manager for the Joint Attack Munitions Systems Project Office, had a major impact on my career. As a result of the influence of all the mentors I've had, I have consistently sought opportunities for greater responsibility and accepted my role to mentor young members of the workforce when the opportunity is presented.

Were there career-broadening experiences that helped in a critical way?

My experiences working for the U.S. Army Special Operations Command in my first acquisition assignment baselined my perspective that our sole responsibility is to provide the absolute best equipment available to warfighters to enhance their ability to win and survive on today's battlefield. It was such an empowering experience to work for America's very best.

What has been your biggest surprise as a member of the Army Acquisition Workforce?

My biggest surprise is the complexity. The acquisition process operates in a very complex environment that requires continuous engagement with the many stakeholders that can influence a program's success or failure. The process demands that the program manager effectively manage stakeholder expectations and facilitate positive solutions to program challenges when they arise. I am continuously amazed with the outstanding efforts made by high-quality people to get the job done in a challenging and complex operating environment.



GEORGE MITCHELL

POSITION:

Test, Measurement and Diagnostic Equipment, Program Executive Office for Combat Support and Combat Service Support, Redstone Arsenal, AL

CERTIFICATIONS:

Level III in production, quality and manufacturing and in program management

EDUCATION: MBA, Webster University; Master of Strategic Studies, U.S. Army War College; B.S., United States Military Academy at West Point

YEARS IN WORKFORCE: 23

AAC MEMBERSHIP: Yes. Also a member of the Defense Acquisition Corps.

Please describe briefly your career path. In what ways did it resemble or not resemble the Program Management Career Model?

My career path resembles the Career Model. I was part of the Year Group 2003 Competitive Development Group (CDG) cohort; completed the Defense Leadership and Management Program (DLAMP), which was the predecessor to the Executive Leadership Development Program; served in various critical acquisition positions; completed a master's degree in business administration; and attended Senior Staff College. I completed the military equivalent of the leadership courses, and have been assigned to several typical assignments, including assistant product manager, deputy product manager, deputy project manager, product manager and product director.

I began my acquisition career as a quality assurance engineer with the Defense Contract Management Agency (DCMA) and became a member of the Army Acquisition Workforce in 2001, serving as a part of the Acquisition Lessons Learned Cell at the Center for Army Lessons Learned at Fort Leavenworth, KS. During my tenure with DCMA, I observed Army and Navy program managers in action firsthand and came to the conclusion that I wanted to

be one of them. During my time at Fort Leavenworth, I was introduced to the CDG program, to which I applied and was accepted. I was placed in an assistant product manager position, and then competed for and was selected for multiple product manager jobs of increasing responsibility.

What do you think was the single most important thing you did to get where you are today?

I put myself in situations—training, jobs and detail positions—to see opportunities for myself and for others to see and know me.

Did a mentor or mentors (or being a mentor) make a big difference in your career advancement? If so, how?

My first mentor, and one with whom I still speak occasionally, is MG William Bond [USA Ret.]. Besides being my commander while I was part of DMCA, he served as my mentor for the DLAMP program. In addition to talking with me about the importance of successfully serving in certain jobs, the most important thing that he related to me was the importance of moving forward in your career—not to sit back but keep reaching for the next higher position.

Were there career-broadening experiences that helped in a critical way?

There were a couple of jobs that I held that were career-broadening. The first instance was my first supervisory position while part of DCMA Bell Helicopter. Although I had been a military commander as part of my active-duty Army career, I had never supervised civilians until then nor dealt with the associated supervisory challenges. Also while part of DCMA, I was selected as the lead for an integrated product team that was drawn from throughout the agency and responsible for updating earned value management guidance and procedures—part of a three-month-plus detail in Alexandria, VA. While my product manager and product director jobs have also been career-broadening, my time as a deputy product manager and then deputy project director definitely expanded my perspective and placed me in situations that I had never encountered as an Army civilian.

What has been your biggest surprise as a member of the Army Acquisition Workforce?

My career has affirmed what my mentor told me several years ago: Have fun and enjoy what you do—and I do, every day.



MIKE WILLS

POSITION:

Long Range Precision Fires, Program Executive Office for Missiles and Space, Redstone Arsenal, AL

CERTIFICATIONS:

Level III in program management and contracting

EDUCATION: M.S. in management, Naval Postgraduate School; B.S. in business management, University of Dayton.

YEARS IN WORKFORCE: 20+ years

AAC MEMBERSHIP: Yes

Please describe briefly your career path. In what ways did it resemble or not resemble the Program Management Career Model?

I transitioned from aviation to Army acquisition because I saw it as an opportunity that could be used throughout my career, including the transition from active duty. While on active duty, I was blessed with multiple assignments that offered me the ability to broaden my experience, including assistant product manager for the Air Warrior Product Manager for Air Warrior Commander in the Program Executive Office Soldier; Defense Contract Management Agency (DCMA) Aircraft Program Management Office South business chief; DCMA Boeing Mesa government flight representative; and DCMA Aircraft Program Management Office. My assignments and schools have been very consistent with the career model.

What do you think was the single most important thing you did to get where you are today?

Learning from the knowledge and experiences of my other team members—peers, subordinates and bosses—to expand my own abilities. Also, I never turned down the opportunity to learn something new or embrace a new challenge. That includes stints as acting business chief and joining the Long Endurance Multi-Intelligence Vehicle [LEMV] Red Team. [LEMV was intended to provide Intelligence, surveillance and reconnaissance support for ground troops through unmanned, medium-altitude long-endurance unmanned aerial vehicle operations. The Army canceled the LEMV project for cost reasons in February 2013.]

Did a mentor or mentors (or being a mentor) make a big difference in your career advancement? If so, how?

I have not had a formal mentor, but have engaged with senior members of my organization when assessing career opportunities and when addressing program issues. Additionally, I have provided mentoring to subordinate personnel, providing them insight into career opportunities to make them more competitive for positions of increased responsibility. I do not have insight into any formal mentoring programs, but the informal approach I have engaged in has provided me the insight for making career decisions. I don't think my career development would look much different had I been involved in a formal approach.

Were there career-broadening experiences that helped in a critical way?

Graduate school and the opportunity to have a range of experience played key roles. Every assignment has provided increased scope and responsibility, which has broadened my career and made me competitive in positions of increased responsibility.

What has been your biggest surprise as a member of the Army Acquisition Workforce?

It's not really a surprise, but the Army has made a significant commitment on talent management and providing opportunities to our workforce. Among the programs I've participated in are the Executive Program Management and Army Acquisition Leader Preparation courses and the Acquisition Leadership Challenge Program. I've also provided opportunities to people in my organization, including rotational assignments at Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT)), deployments to theater supporting PEO Aviation or ASA(ALT); programs for pursuing advanced degrees at colleges or the Naval Postgraduate School, for example; and the Senior Service College Fellowship.

2nd Annual

Major General Harold J. "Harry" Greene Awards for Acquisition Writing

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.



"You must have passion to do this [acquisition] business right. We need to work toward win-win solutions to our challenges."

- Major General Harold Greene
1959-2014

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The deadline for entries is August 16, 2015
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MENTORING FOR SUCCESS

A review of formal mentoring efforts yields a list of to-dos and must-haves for developing programs that enhance career development for mentors and mentees alike.

by Dr. Stan Emelander

Enthusiasm for mentoring programs continues to grow. It's cited as the most popular talent development method of 2014, according to Michael Bergelson, CEO of Everwise, a company that specializes in mentoring, and 96 percent of Fortune 500 executives responding to a recent survey said mentoring is important for career development, according to a report in *Parameters*, the U.S. Army War College Quarterly. Today's careers are marked by increasing change and instability, and mentors can provide a source of much-needed continuity. Knowledge workers often need a longer period to learn the subtleties of their roles, similar to apprentices in skilled trades who, from at least the Middle Ages, developed with the guidance of a master. Similarly, today's workers benefit from the knowledge and experience of a more experienced mentor to help guide their career development. Mentors can also be a resource to mentees transitioning into new jobs, speeding their route to effectiveness.

I had the opportunity to focus on mentoring during a six-month (September 2014 – March 2015) developmental assignment at the Office of the Army Director, Acquisition Career Management (DACM), within the U.S. Army Acquisition Support Center (USAASC) at Fort Belvoir, VA. The Army DACM Office provides certification, career guidance and developmental opportunities to the 37,000-strong



MENTOR CONNECTION

Mentoring is a valuable tool in growing a professional knowledge workforce, so long as leadership, the project manager and participants have clear goals and objectives for making it work for the organization and the individuals. (SOURCE: istock/thinkstock)

Army Acquisition Workforce, including the 11 program executive offices under the executive authority of the Hon. Heidi Shyu, assistant secretary of the Army for acquisition, logistics and technology and Army acquisition executive. The DACM, LTG Michael E. Williamson, supports mentoring as a talent management initiative across the acquisition workforce. The experience taught me some key takeaways about mentoring program success drawn from research, interactions with experts, particularly Dr. Terry Scandura, and LTC Darcy Snack, who heads the leadership program at the U.S. Military Academy, and work with practitioners during my USAASC tour.

Formal mentoring, a facilitated program with designated mentee-mentor pairs, is the most mainstream type of mentoring. Formal programs often follow an annual cycle for recruiting participants and settling them into pairs who focus on development

of the mentee. (Most mentoring programs use “mentee” rather than “protégé,” as most consider the latter less professional and somewhat demeaning to the mentee.) While organizations can pursue a variety of mentoring options, including group mentoring, reverse mentoring (where more tech-savvy younger mentors impart skills to more senior colleagues) and speed mentoring, formal mentoring is the most widespread and the focus at the Army DACM Office. Formal mentoring is also the most thoroughly researched method, the one we can have the greatest confidence in for identifying best practices and lessons learned.

THE WHY AND THE WHAT

The first conditions for a successful mentoring program are establishing a business case and deciding on goals. The business case for mentoring should link the program to the organization’s strategy, explaining how mentoring will support success.



MENTORING RESOURCE

The USAASC mentoring website is a valuable resource for tools and links on formal mentoring.
 (SOURCE: USAASC)

Everyone involved, from administrators to participants, should understand why an organization’s people need a mentoring program. If the business case is the “why” for mentoring, the goals are the “what.” Identifying goals is crucial because it determines how the organization will measure achievements and provides direction to administrators and participants. Since 1985, when Dr. Kathy Kram’s seminal “Mentoring at Work” focused attention on the subject, researchers have identified a variety of beneficial outcomes from mentoring programs, including increased job satisfaction, lower turnover, greater recruiting appeal and more rapid career growth.

In addition to technical skills and knowledge, mentoring programs can also emphasize leadership and managerial competencies. To make solid achievements in leadership it is especially

important that the mentee-mentor pairs know what goals they are working toward. The absence of clear goals can result in all parties wondering just what they accomplished at the end of the program. Lacking both goals and a business case may make mentoring programs indefensible when the organization assesses what talent management efforts to keep or eliminate.

Identifying an executive sponsor and enthusiastic program manager are other key ingredients for mentoring program success. Projects are defined as endeavors that bring forth a unique product or service. At its start, from setting up the program through completion of the first annual cycle of mentor-mentee partnerships, a new mentoring program is a project accomplishing something new in the organization. The crucial importance of the sponsor and the program (or project) manager are both recognized in



project management thinking. The program manager is responsible for planning and executing the effort, usually by forming and leading a project team.

In addition, the program manager must be an enthusiastic spokesperson for their program, building support wherever they can. This is especially true for formal mentoring programs often must overcome resistance to become successful. The spokesperson role is important as it is directed up, toward executive managers, as well as down, toward potential participants.

The second most important person for the new mentoring program is often the executive sponsor. Similar to the role of a valid business case, an executive sponsor keeps a new mentoring program from becoming isolated and unsupported. Lack of sponsorship is a leading reason projects fail, including internal projects like mentoring. Often, the impulse to pursue mentoring originates with an executive-level manager, making sponsor identification easy. Other times the program manager needs to seek out a sponsor. Sometimes the program manager may have to fight for a sponsor to ensure that the program won't be orphaned far down the management chain.

Regardless of the method that brings them together, the program manager and the sponsor should meet regularly to ensure that both are on the same track concerning goals, progress, risks and resources. The sponsor helps champion the program and is often involved in answering the program manager's questions and providing direction. Mentoring is both a career development and organizational change initiative. Similar to other change efforts, it will likely fade away without executive support and enthusiastic execution. The program manager and sponsor collaborate to ensure that does not happen.

THE IMPORTANCE OF A GOOD MATCH

Participant selection and mentor-mentee matching are often the two most demanding activities of the program. If the program is oriented toward high-potential mentees, weak participant screening and selection can seriously undermine its reputation as well as the program administrators' morale. Programs that are more open and accessible to the workforce at large (i.e., not just individuals identified as high-potential) may be more tolerant of a wider variety of participants. A method I recommend for screening participants into a program, based on conversations with a half-dozen current program administrators, is to include supervisor or rater recommendations as a prerequisite and to limit the number of recommendations per supervisor. The supervisor recommendation ensures some by-in and screening by the management chain and the limit is a method for screening.

I looked at a few dozen different programs and found big differences in how much effort they expended matching mentee-mentor pairs. Good mentee-mentor matching supports program success, helping to establish and accelerate strong relationships. It also helps to screen out incompatible matches, limiting the potential for mentoring disaster stories that can damage the program. Investing more time in screening and matching is a worthwhile trade of speed and efficiency in the early stages in return for reduced risk and a greater chance of outstanding mentoring partnerships as the program develops.

Program administrators often use a template for screening and matching, and the quality of those forms varies widely. After reviewing many forms and analyzing how they are used by both program administrators and participants, I concluded that

an application form combining quantitative, check-the-box style questions about goals and interests with qualitative narrative questions about career aspirations is best. The check-box questions support efficient matching, and the narrative questions give more depth and make the application form a resource for mentees and mentors to start getting to know each other before they meet face to face. A best practice is for facilitators to match a few good potential mentors to a mentee and then allow the mentee to make the final selection. Doing it this way combines the efficiency of centralized matching, using the application form, with self-choice and autonomy for the mentee.

BUILDING TRUST THROUGH TRAINING

Another essential activity to support fruitful mentoring partnerships is orientation training. Just as a few key factors often separate a mediocre mentoring program from an outstanding one, so it is with mentoring partnerships. Among the factors contributing to a successful experience, two stand out: building trust and identifying optimum goals. Orientation training accelerates development of both areas.

Everyone involved, from administrators to participants, should understand why an organization's people need a mentoring program.

Since 1985, when Dr. Kathy Kram’s seminal “Mentoring at Work” focused attention on the subject, researchers have identified a variety of beneficial outcomes from mentoring programs, including increased job satisfaction, lower turnover, greater recruiting appeal and more rapid career growth.

Strong trust facilitates all areas of mentoring, from exploring performance strengths and weaknesses to giving and receiving beneficial feedback. Trust that’s founded on similar personalities and mutual interests is often the greatest difference between informal and formal mentoring relationships. I liken the situation for formal programs to trying to build an artificial reef for trust to settle and grow upon. Administrators need to do all they can to make conditions on the artificial reef even better than those on naturally occurring informal mentoring reefs.

Orientation training helps build trust in several ways. If the mentoring pair is meeting for the first time, the training is a shared experience that can bring them closer. Second, trust-building exercises and icebreakers can specifically be included as part of the training. Third, the training can address skills intended to facilitate respectful communications between mentee and mentor, including active listening, giving and receiving feedback, negotiations and having crucial conversations, for example, conversations where the stakes are high and likely to become emotional. Orientation training should also include trust-building tips like learning and remembering personal details and special occasions such as birthdays and anniversaries, striving to overdeliver on personal commitments and occasionally meeting outside the confines of the workplace, if both mentee and mentor are comfortable with a change in setting.

Goal achievement is another important topic for orientation training. While

mentors often benefit from the experience, the explicit aim of a mentoring relationship is usually to achieve goals of significance to the mentee, with new goals being set as earlier ones are achieved. The process becomes iterative with recurring steps like goal identification, attempted breakthroughs, reflection on the attempts and evaluation of new goals. Orientation training explores this process along with the skills needed by mentees and mentors at each step. A best practice is to train in setting SMART goals—“specific, measurable, achievable, relevant and time-related.”

A final activity the mentoring program administrator must accomplish is collecting and interpreting results. The program may have been wonderfully executed and resulted in satisfying relationships and substantial professional gains for participants. However, if the program manager does not collect and communicate information about these outcomes and how they fulfilled business case objectives to the appropriate executives, it may be as if the gains never happened. Interviews and surveys administered to participants are the most common methods for collecting end-of-cycle results. As mentioned above, if the program lead and sponsor can clearly articulate the program’s goals, then they should have an accurate idea of what they want to measure well before the first cycle ends.

CONCLUSION

My purpose is to share observations and lessons learned in formal mentoring with leaders and program administrators. A

final thought is that it is not practical to compare formal mentoring programs with informal, natural mentoring that occurs without special encouragement. Informal mentoring is ideal because it is built upon the mutual compatibility of the mentee-mentor pairs. Because they like each other, their relationship will almost always be satisfying.

The problem is that these relationships are relatively uncommon—too rare, unfortunately, to be the basis for a human resources development program. So while we should encourage natural mentoring whenever it occurs, formal mentoring programs have a substantial and useful role in fostering professional development and worker engagement success.

For more information, go to the USAASC mentoring website at <http://asc.army.mil/web/policies-main/mentoring>, which focuses on tools for program administrators and mentee-mentor partnerships. The website has links to high-quality program guides, a list of print resources and downloadable forms and templates to support partnerships throughout their life cycle.

DR. STAN EMELANDER is a systems acquisition manager in Product Manager Individual Weapons, part of the Soldier Weapons project office in the Program Executive Office for Soldier. He holds a Ph.D. in organization and management from Capella University, an MBA and an M.S. in systems management from the Florida Institute of Technology and a B.S. in physics from the United States Military Academy at West Point. He holds a Project Management Professional certification, and is on the faculty of the Florida Institute of Technology. He is Level III certified in program management and Level I certified in systems engineering.



PEAK *of* PROFESSIONALISM

ASA(ALT) leadership presents acquisition and contracting awards honoring expertise, commitment and successful project execution.

by Mr. Chris Geisel



CONGRATULATIONS

LTG Michael E. Williamson addresses the audience at the 2014 Army Acquisition and Contracting Awards Ceremony.

Two dozen teams and individuals received 2014 Army Acquisition and Contracting Awards, recognizing contributions across a variety of disciplines in equipping warfighters for mission success.

“What a great event and honor to recognize the many successes of our acquisition professionals from across the various program offices and commands in support of the current fights and future defense of our nation,” said the Hon. Heidi Shyu, assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)) and the Army acquisition executive. “I am always very impressed and humbled by the professionalism, commitment and dedication of our workforce, and recognitions such as these just highlight how fortunate the Army is to have such a talented workforce.”

Shyu presented the awards at a ceremony in Huntsville, AL, hosted by the Program Executive Office (PEO) for Missiles and Space. Also participating in the April 28 ceremony were LTG Michael E. Williamson, principal military deputy to the ASA(ALT) and director of acquisition career management; Harry P. Hallock, deputy assistant of the Army (DASA) for procurement; and Steven V. Karl, director of acquisition logistics policy in the Office of the DASA for Acquisition Policy and Logistics.

The event also included the inaugural MG Harold J. “Harry” Greene Awards for Acquisition Writing, which recognize distinguished work that is instrumental in shaping the public dialogue about Army acquisition.

Greene was killed Aug. 5, 2014, while deployed to Afghanistan. At the time of his death, he was deputy commanding general of the Combined Security Transition Command – Afghanistan. Previously he served as the deputy for acquisition and systems management in the Office of the ASA(ALT).

THE 2014 AWARDS AND THEIR RECIPIENTS ARE:

Acquisition, Logistics and Technology Continuous Performance Improvement Award: Improve the User Account Provision Timeline Lean Six Sigma Black Belt Project Team, PEO Enterprise Information Systems, Fort Belvoir, VA.

Army Life Cycle Logistician of the Year Award: Ollie Toney, U.S. Army Aviation and Missile Life Cycle Management Command, Redstone Arsenal, AL.

Director, Acquisition Career Management Award: Susan McKinnis, U.S. Army Contracting Command (ACC) – Rock Island, IL.

Acquisition Director of the Year at the Lieutenant Colonel Level: LTC Robert Mathews, U.S. Army Mission and Installation Contracting Command (MICC), Fort Hood, TX.

Acquisition Director of the Year at the Colonel Level: COL Paul Pardew, formerly commander of the 414th Contracting Support Brigade (CSB), Vicenza, Italy. (Pardew currently is director of the Operational Contract Support and Services Division, Joint Staff J-4.)

Product Manager of the Year: LTC Francisco Lozano, Armored Brigade Combat Team, PEO Soldier, Fort Belvoir, VA.

Project Manager of the Year: COL William Sheehy, Program Manager for Armored Brigade Combat Team, PEO Ground Combat Systems, Warren, MI.

Army Acquisition Excellence Award for Individual Sustained Achievement: Suanne Coonrad, ACC – Aberdeen Proving Ground (APG), MD.

Army Acquisition Excellence Award for Equipping and Sustaining Our Soldier's Systems: XM1156 155 mm Precision Guidance Kit New Equipment Training Team, PEO Ammunition, Picatinny Arsenal, NJ.

Army Acquisition Excellence Award – Information Enabled Army: Program Management Office for Unmanned Aircraft Systems, PEO Aviation.

Army Acquisition Excellence Award for Transforming the Way We Do Business: Program Management Office for Ammunition and Weapons, U.S. Special Operations Command, MacDill Air Force Base, FL.

ASA(ALT) Contracting Noncommissioned Officer Award for Contracting Excellence: SFC Larin Harris, ACC – APG.

Secretary of the Army Awards for Excellence in Contracting, Barbara C. Heald Award: Tracey E. Shaw, U.S. Army Corps of Engineers, Middle East District, Winchester, VA.



CONTRACTING STANDOUT

Deisy D'Ambrosio of the NSRWA/FMS Directorate at ACC – Redstone Arsenal receives the Outstanding Contracting Officer Systems, Research and Development, Logistics Support (Sustainment) Contracting Award from the Hon. Heidi Shyu April 28 in Huntsville. D'Ambrosio provided exceptional support to PEO Aviation's NSRWA mission. She was instrumental in developing effective contracting strategies and defining improved acquisition processes and procedures in conjunction with the recently established project office. (Photos by Henry Norton, PEO Aviation)



ACQUISITION AUTHOR

Ernest Keen, the winning author in the innovation category of the MG Harold J. "Harry" Greene Awards for Acquisition Writing, receives honors from the Hon. Heidi Shyu and LTG Michael E. Williamson.



ACQUISITION DIRECTOR OF THE YEAR

LTC Robert Mathews of MICC – Fort Hood receives honors as acquisition director of the year at the lieutenant colonel level from the Hon. Heidi Shyu and LTG Michael E. Williamson. Mathews effectively supported the warfighter, increased customer satisfaction and fostered military integration through leadership and team building, thereby creating a diverse civilian, military and contractor workforce that develops, implements and executes numerous successful Army contracting operations and provides superior support to the command.

Exceptional Support of the AbilityOne Program Award: Joan Wyoske, ACC – Rock Island.

Outstanding Contract Specialist and Procurement Analyst Award (tie): Bethany Hull, U.S. Army Corps of Engineers, Middle East District, and Jeffrey Knight, ACC – Redstone Arsenal.

Outstanding Contracting Officer, Installation Level – Directorate of Contracting: Steven Dunbar, ACC – Rock Island.

Outstanding Contracting Officer, Systems, Research and Development, Logistics Support (Sustainment) Contracting: Deisy D’Ambrosio, Non-Standard Rotary Wing Aircraft (NSRWA)/Foreign Military Sales (FMS) Directorate, ACC – Redstone Arsenal.

Outstanding Contracting Officer, Specialized Services and Construction Contracting: Derek Schnorrenberg, ACC – Rock Island.

Outstanding Contracting Officer, Contingency Contracting: MAJ Anthony Rogers, 413th CSB, U.S. Army Expeditionary Contracting Command (ECC), Fort Shafter, HI.

Outstanding Unit/Team Award for Systems, Research and Development, Logistics Support (Sustainment) Contracting: Paladin Integrated Management Low-Rate Production Negotiation Team, ACC – Warren, MI.

Outstanding Unit/Team Award for Contingency Contracting: Regional Contracting Office, 410th CSB, ECC, Guantanamo Bay, Cuba.

Outstanding Unit/Team Award for Installation Level – Directorate of Contracting: Service and Construction Team, Regional Contracting Office, 414th CSB, ECC, Caserma Del Din, Italy.

Outstanding Unit/Team Award for Specialized Services and Construction Contracting: Branch E of the Global Reachback Contracting Division, ACC – Rock Island.

Winners of the 2014 MG Harold J. “Harry” Greene Awards for Acquisition Writing, in four categories, are:

Acquisition Reform/Better Buying Power: COL Linda R. Herbert, Veronica Alexander and Dr. Christina M. Bates.

Future Operations: LTC Adrian Marsh.

Innovation: Ernest Keen.

Lessons Learned: MAJ Garrett Bruening.

For more detail on the award winners’ work, go to <http://asc.army.mil/web/access-army-acquisition-corps-recognized/>.

MR. CHRIS GEISEL is a strategic planning and communications specialist for the PEO Missiles and Space. He holds an M.S. in public administration and a B.A. in journalism from Angelo State University. A retired Air Force public affairs officer (PAO), he has worked in a variety of PAO positions at the base, major command and Pentagon levels. Most recently, he provided strategic communication support to the NATO Medium Extended Air Defense System Management Agency. He is Level II certified in program management.





CAREER CORNER

USAASC PERSPECTIVE

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

SHARED KNOWLEDGE IS THE BEST KIND



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

My emphasis has always been on “putting people first” when it comes to helping the Army Acquisition Workforce develop the training, education and experience needed to become true professionals. A critical tenet of that mantra is mentorship, whereby a senior, more experienced professional (mentor) advises, counsels and guides a junior employee (a mentee or protégé) on career progression; the mentor shares knowledge, expertise and skills, along with the insights and challenges encountered during his or her own career progression. The ultimate goal is to foster professional growth, develop leaders, transfer knowledge, and improve and maintain a productive acquisition workforce.

LTG Michael E. Williamson, military deputy to the assistant secretary of the Army for acquisition, logistics and technology (ASA(ALT)) and director of acquisition career management (DACM), maintains that mentoring is a key part of the acquisition career talent management strategy. “It is one of our most important

leader development initiatives for both mentors and mentees. In fact, developing others is a core principle of leadership. Mentoring is also about leaving a legacy and preparing for the future at the same time. It is an important part of how our organizations pass knowledge from one generation to another.”

PREPPING NEW LEADERS

In April, the Army DACM Office presented the next facet of its talent management program by launching the first-ever Army Acquisition Leader Preparation Course (AALPC). This pilot session for new centrally selected program managers, contracting commanders, product directors and acquisition leaders was a forum on managing complex acquisition systems and programs, problem-solving and challenges that the selectees may encounter in their new leadership roles. The Hon. Frank Kendall, undersecretary of defense for acquisition, technology and logistics, the Hon. Heidi Shyu, ASA(ALT), and LTG Williamson gave their insights on leadership and answered questions on how to get the best experience from their new leadership assignments.



Participants also heard from acquisition experts from industry, think tanks and academia, all offering their perspectives on problem-solving and leadership.

The intent of this pilot is to offer focused, acquisition-specific training with peers and seasoned leaders to smooth the learning curve and lessen the initial shock that comes with assuming an acquisition leadership role, by allowing the prospective leaders to know beforehand some issues they may face and learn their roles in resolving them. It also establishes a network of practice among the new leaders, so that once they're on the job and encounter "troubled waters," they know the right person to contact—someone who has experienced a similar situation and can offer direction and sage advice for a better outcome. This first AALPC begins a tradition of acquisition-unique leadership training for our workforce, fostering career growth and posturing them for success.

LESSONS APPLIED

Tell me and I forget. Teach me and I may remember. Involve me and I learn.

—attributed to Benjamin Franklin

Every acquisition professional faces challenges in their day-to-day responsibilities, and at times those challenges can be overwhelming. It's only natural as a professional to want to solve your own problems and learn from the experience. But we don't have to step into pitfalls if they can be avoided, as many can. It is likely that what you're encountering has been lived and learned before. So why not seek counsel from a mentor or another professional who's "been there, done that?" A professional's prior experience can help guide you through the difficult times.

Another good source for guidance is the Acquisitions Lessons Learned Portal at <https://allp.amsaa.army.mil/pub/Home.aspx>, where you can browse lessons learned from professionals across the acquisition enterprise and submit your own experiences.

LTG Williamson has said many times that lessons learned aren't really valuable unless they're lessons applied. I agree with him wholeheartedly. The fact that we can capture what worked or didn't work, pitfalls and success stories is very interesting. But at the end of the day, if they are not taken to heart, they're just academic. They have to be understood and applied in follow on and future situations—otherwise, they are just words on paper.



SCOPING OUT NEW CHALLENGES

Participants in the first-ever AALPC, designed to prepare Army acquisition leaders to assume new leadership responsibilities, gather at the kickoff in April of the four-day course at the National Conference Center in Leesburg, VA. The AALPC is a key part of the Army DACM Office's talent management program. (Photo by Stephanie Watson, USAASC)

ON THE MOVE



MULLER APPOINTED CERDEC DIRECTOR

MG John F. Wharton, commanding general (CG) of the U.S. Army Materiel Command's (AMC's) Research, Development and Engineering Command, appointed **Henry J. Muller Jr.** director of the U.S. Army Communications-Electronics Research, Development and Engineering Center (CERDEC), effective March 22.

Muller's previous assignment was as director for CERDEC's Intelligence and Information Warfare Directorate (I2WD), where he led the Army's working group for development of its cyber materiel strategy, released in February. Muller entered the Senior Executive Service (SES) in November 2008 as director of CERDEC's Space and Terrestrial Communications Directorate. Before that, he served four years as CERDEC's associate director and two years as chief of the Information Operations Division of I2WD. (Photo by Conrad Johnson, U.S. Army Research, Development and Engineering Command Public Affairs)

WYCHE SUCCEEDS MCQUISTION AS AMC DEPUTY CG



AMC welcomed its 45th deputy commanding general (DCG) and chief of staff in a formal ceremony at Redstone Arsenal, AL, on April 13. **LTG Larry D. Wyche** officially assumed the duties as AMC's second in command April 10. This assignment marks a return to AMC headquarters for Wyche, who served as its deputy chief of staff for operations and logistics from August 2010 to June 2012. In 2008, Wyche took command of the Joint Munitions and Lethality Life Cycle Management Command, a major subordinate command of AMC.

"He knows our mission; he knows our workforce and he knows our customer—the Soldier," said **GEN Dennis L. Via**, AMC CG. "He is certainly the right person at the right time to keep AMC moving in the right direction." As the new DCG, Wyche will be responsible for the day-to-day operations of the command, including the organic industrial base, logistics readiness centers and major subordinate commands.

Wyche takes over from **LTG Patricia E. McQuiston**, who had served in that position since August 2012. McQuiston culminated more than 34 years of service to the Army with a retirement ceremony April 10 at Redstone Arsenal.

Although she grew up in an Army family and rose to become one of five three-star female Army generals on active duty at the time of her retirement, McQuiston told the Redstone Rocket that she did not intend to build a career as a Soldier. As it happened, a master sergeant approached McQuiston while she was waiting in line to enroll for her first semester of classes at the University of Akron in Ohio. He told her about ROTC and the possibility of a stipend and scholarship. She "liked the idea of ROTC," she said, and agreed to take the one-hour introductory ROTC course if she could find the course number in the catalog before reaching the front of the line.

She did, and signed up for ROTC and a four-year commitment to the Army, during which she met and married her husband, now-retired **COL Leif Johnson**. They raised three children, now grown, as they juggled family and careers—for McQuiston, seven commands and multiple overseas tours, among other assignments.

"The Army has provided me a world of opportunities that wouldn't have been available to me in any other endeavor that I would have ever considered," she told the Redstone Rocket. "I am simply proud that I was allowed to serve."



HONORING 34 YEARS OF SERVICE

LTC Patricia E. McQuiston receives congratulations from AMC CG GEN Dennis L. Via during her retirement ceremony April 10 at Redstone Arsenal, where she was presented with the Distinguished Service Medal and the General Brehon B. Somervell Medal of Excellence. (Photo by Megan Cotton Gully, AMC)



BOSTICK TO HEAD AMC LOGISTICS INTEGRATION

Kevin J. Bostick takes the oath of office from John B. Neger, AMC's executive deputy to the CG, during a ceremony appointing him to the SES, held April 17 at Redstone Arsenal. Bostick will serve as AMC's Logistics Integration Division chief within AMC G-3/4 Operations and Logistics.

In his new role, Bostick is responsible for sustaining the joint warfighter through command

and control of supply chain management, depot and National Maintenance Program operations, asset management and distribution, reset, and ammunition and chemical stockpile management. The previous chief of the Logistics Integration Division was Lisha H. Adams, who departed in September 2014 to serve as the deputy assistant secretary of defense for materiel readiness. (Photo by Kim Hanson, AMC Public Affairs)



O'NEILL NAMED AMC CTO

Secretary of the Army John McHugh announced the reassignment of Patrick J. O'Neill as AMC's chief technology officer (CTO) on March 27. O'Neill leads all aspects of AMC's science and technology (S&T) development, setting the strategic direction for S&T across the spectrum of sophisticated weapon systems and cutting-edge technology.

O'Neill, who was appointed to the SES in March 2011, had served as acting CTO since September 2014. Before that, he was the technical director of the U.S. Army Materiel Systems Analysis Activity (AMSAA) at Aberdeen Proving Ground (APG), MD, responsible for overseeing the entire technical program performed by more than 300 analysts within AMSAA. O'Neill is the second person to hold the CTO position, succeeding Dr. Grace M. Bochenek, who transitioned to serve as the director for the U.S. Department of Energy's National Energy Technology Laboratory in September 2014.

LOWMAN NAMED DASA(APL)

The Hon. Heidi Shyu, ASA(ALT) and Army acquisition executive, has announced the newest member of the ASA(ALT) leadership team: Christopher J. Lowman, who will serve as deputy assistant secretary of the Army for acquisition policy and logistics.

Lowman, who was selected for the SES in December 2008, has developed field and sustainment maintenance expertise during his career in military logistics, serving as a Marine and an Army civilian. Most recently, he was director for maintenance policy, programs and processes in the Office of the Deputy Chief of Staff, G-4. In this role, he authored the first Army organic industrial base strategy, centered on maintaining core capabilities and establishing a balance with the defense industrial base.

KING ASSUMES 20TH CBRNE LEADERSHIP

BG JB Burton relinquished command of the 20th Chemical, Biological, Radiological, Nuclear and Explosives (CBRNE) Command to BG William E. King IV May 20 during a ceremony at APG's Edgewood Area. A former 20th CBRNE operations officer, King previously served as the assistant deputy chief of staff, G-3/5/7 (Readiness), for U.S. Army Forces Command at Fort Bragg, NC. Burton had led the 20th CBRNE Command since May 2013.



EDWARDS ENDS 33-YEAR CAREER

Terence M. "Terry" Edwards concluded his 33-year Army civilian career at a retirement ceremony April 21 at APG. Edwards, who began his career as an engineer at Fort Monmouth, NJ, rose through the ranks to become a member of the SES in May 2005. He held senior assignments at AMC; the Office of the Army Chief Information Officer/G-6; and the Office of the ASA(ALT) before returning to the Program Executive Office for Command, Control and Communications – Tactical (PEO C3T) to close his career.

MG Daniel P. Hughes, PEO for C3T, presented Edwards with numerous meritorious awards at his April 21 retirement ceremony, including the Army Meritorious Civilian Service Award, the Signal Corps Regimental Association Bronze Order of Mercury and a congratulatory letter from President Barack Obama. (Photos by Denise Rule, PEO C3T)



VARNADORE HEADS TO SCHOOL

COL Marcus L. Varnadore, who most recently served as the Product Manager (PdM) for Airborne, Maritime and Fixed Station under PEO C3T's project manager for tactical radios, was promoted to his new rank during a ceremony at APG on May 15. Varnadore, who also received the Meritorious Service Medal during the ceremony, will attend the Senior Service College at the Dwight D. Eisenhower School for National Security and Resource Strategy at Fort McNair, Washington, DC.

He joined Army Acquisition in 2001 and has served in numerous acquisition assignments, including program and plans officer at the U.S. Army Research Laboratory; assistant product manager for aircraft survivability equipment at the U.S. Army Special Operations Command's Technology Applications Program Office; rotary wing aircraft systems acquisition manager for the Special Operations Research, Development and Acquisition Center of the U.S. Special Operations Command; and deputy U.S. Army Training and Doctrine Command capability manager for reconnaissance and attack helicopters at the U.S. Army Aviation Center of Excellence.

MG Daniel P. Hughes, PEO for C3T, presented Varnadore with the Meritorious Service Medal during the promotion ceremony. (Photo by Ryan Myers, PEO C3T)





DAVIS CULMINATES USAR CAREER WITH 30 YEARS OF SERVICE

ASA(ALT) Principal Military Deputy **LTG Michael E. Williamson** presided over U.S. Army Reserve (USAR) **COL Scott J. Davis'** military retirement ceremony May 1 at the U.S. Army Garrison – Detroit Arsenal, Warren, MI. Davis began his military career in 1985, holding various assignments as an engineer and acquisition officer while serving as a DA civilian, currently as the PEO for Combat Support and Combat Service Support (CS&CSS) since March 2014. His final USAR assignment was as director of Soldier and maneuver systems for the ASA(ALT). Williamson acknowledged the support Davis' family has given him throughout his career by presenting Mrs. Davis with the Commander's Award for Public Service and his sons with Department of the Army Certificates of Appreciation. Davis also received the Legion of Merit and the Army Engineer Association's Silver Order of the de Fleury Medal.



NEW PdM UNMANNED GROUND VEHICLES

Scott J. Davis, PEO for CS&CSS, presents the Army Engineer Association Bronze Order of the de Fleury Medal to **LTC Lawrence Dring** during his May 15 change-of-responsibility ceremony. Dring relinquished responsibility as the PdM for Unmanned Ground Vehicles to **Louis A. Anulare**, a Marine Corps civilian, in a May 15 ceremony at the U.S. Army Garrison – Detroit Arsenal, Warren, MI. Anulare joins PEO CS&CSS following his assignment as robotics project lead at Marine Corps Systems Command. Dring now heads to Picatinny Arsenal, NJ, where he will serve as PEO Ammunition's product director for non-standard ammunition. **Bryan McVeigh**, left, Project Manager for Force Projection, presided over the event. (Photos by Rae A. Higgins, PEO CS&CSS Strategic Communications)

GENERAL OFFICER ANNOUNCEMENTS

The Chief of Staff, Army announces the following officer assignments:

MG Daniel P. Hughes, PEO C3T, APG, to DCG for support, Combined Security Transition Command – Afghanistan, Operation Freedom's Sentinel, Afghanistan.

MG Camille M. Nichols, director of business operations, Office of Business Transformation, Office of the Undersecretary of the Army, Washington, DC, to director, Sexual Assault Prevention and Response Office, DOD Human Resources Activity, Office of the Undersecretary of Defense (Personnel and Readiness), Alexandria, VA.

MG Ole A. Knudson, program executive, programs and integration, Missile Defense Agency (MDA), Redstone Arsenal, to deputy director, MDA, Redstone Arsenal.

The following general officers were promoted to the ranks indicated below from April through May 1.

LTG Larry D. Wyche, currently serving as DCG/DCS, AMC, Redstone Arsenal.

BG Patrick W. Burden, currently serving as deputy PEO for Ammunition and senior commander, Picatinny Arsenal, NJ.

BG Brian P. Cummings, currently serving as PEO for Soldier, Fort Belvoir, VA.

CORRECTION:

An error in the April/June On the Move section erroneously identified individuals in one photograph and omitted a name in another. These are the correct photos and captions.



IPPS-A INCREMENT II PdM PROMOTED TO COLONEL

Douglas K. Wiltzie presents a certificate of promotion to **COL Kevin Vanyo** during his Jan. 9 promotion ceremony at the Hoffman Building, Alexandria, VA. (Photo by Sam Soleimanifar, PEO EIS Communications Support)

PD RCAS GETS A NEW DPD

Sajjan "Saj" George, right, was introduced as the new deputy project director for Reserve Component Automation Systems (PD RCAS) during an all-hands event Dec. 15, 2014, hosted by RCAS Project Director **Ralph Ocasio**, left. PD RCAS is a project of the PEO for Enterprise Information Systems, which provides integrated Web-based software solutions and support services that enhance the efficiencies of the Army National Guard and the U.S. Army Reserve in managing mobilization, safety, personnel, force authorization, requirements management, infrastructure refresh and distributed learning program capabilities. (Photo by Pete Van Schagen, RCAS Strategic Communications)



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CENTURIES OF SUPPORT

This Soldier and his Doberman served during World War II. (Photo courtesy of U.S. Marine Corps Archives and Special Collections)

DOGS of WAR

Dogs are no strangers to war. Indeed, it's likely that canine militarization is as old as canine domestication. Historical accounts of dogs participating in warfare date at least as far back as the middle of the seventh century B.C. According to a 1915 article in *The New York Times*, the Egyptians used dogs in war in the fifth century B.C., and "it is certain that no metaphor was intended by Shakespeare when he made Antony exclaim, 'Cry "havoc" and let slip the dogs of war.'"

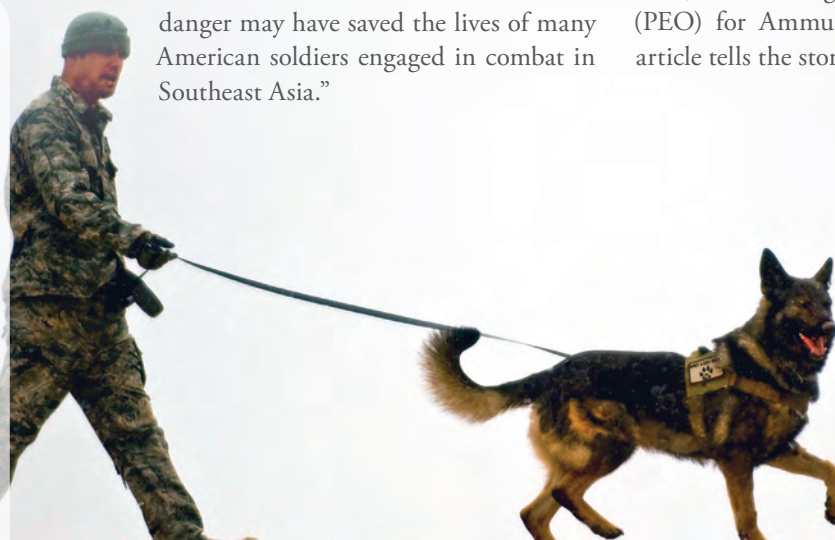
The article concludes with the news that the program to supply those dogs out of the U.S. Army Land Warfare Laboratory at Aberdeen Proving Ground, MD, had earned John J. Romba, a research psychologist, and Dr. Max Krauss, chief of the lab's Biological Science Branch, DA commendations "for meritorious service in recognition of their work on the project."

Today, 45 (human) years on, dogs still play an important role in the Army, thanks to their intelligence, highly developed sense of smell and highly accurate hearing. But today's dogs have much better accommodations, and their handlers now have the proper equipment for training and health, thanks to the Project Manager for Close Combat Systems (PM CCS) of the Program Executive Office (PEO) for Ammunition. The following article tells the story.

In the November-December 1970 issue of this magazine's predecessor publication, *Army Research and Development* magazine, the article "Canine Caution Warns Troops of Concealed Dangers" describes how "canine consciousness of concealed danger may have saved the lives of many American soldiers engaged in combat in Southeast Asia."

TRAINING FOR MISSION SUCCESS

A military working dog (MWD) handler runs his military working/patrol explosive detection dog through explosive device detection training. MWDs must be trained and certified in detecting both military-grade and homemade explosives, and must be recertified annually. (U.S. Air Force photo by MSgt Adrian Cadiz)





SNIFFING OUT IEDS

A Soldier and a U.S. Air Force working dog conduct patrols with the Afghan Border Police in Afghanistan in January 2013, in search of locals suspected of creating improvised explosive devices. While the Air Force provides the services with standardized capabilities for MWDs, the services are responsible for equipping, maintaining and follow-on training, including explosive detection. (U.S. Army photo by SPC Alex Kirk Amen, 115th Mobile Public Affairs Detachment)



NEW DIGS and MORE **for SOLDIER DOGS**

by Mr. Frank Altamura

Military working dogs (MWDs) have become specialized and unique in their own way and assigned mission. However, one aspect they have in common with other Soldiers is their need for equipment, training, proper care and good health. This is the niche that PEO Ammunition fills. Through the process of capabilities development for rapid transition, PM CCS assumed responsibility for the Family of Military Working Dog Equipment (FoMWDE) in May 2008.

The Army designated the working dogs and the equipment as an official program of record, establishing a funding line in the budget to procure and sustain equipment sets to support this vital asset. The Army's Office of the Provost Marshal General manages the requirement for the dogs, while PM CCS manages all the equipment. FoMWDE includes an array of different equipment sets for handlers, first aid, facility and obedience courses in addition to the Worldwide Deployable Kennel System (WDKS) and the Canine Explosive Scent Kit.

Just as important as funding to the program's success are the standardization and cataloging of equipment, creating a one-stop shop at the Defense Logistics Agency to replace equipment, and have it all approved by the entire MWD community. PM CCS' Product Manager for Counter Explosive Hazard (PdM CEH) worked across

the community of stakeholders, including the U.S. Army Armament Research, Development and Engineering Center (ARDEC), Rock Island Arsenal, IL, the U.S. Army Maneuver Support Center of Excellence and users from the U.S. Army Maneuver Center of Excellence's Capabilities, Development and Integration Directorate and the military police (MP) and engineer schoolhouses. Additionally, the Office of the Provost Marshal General, the U.S. Army Veterinary Corps, the Joint Services MWD integrated product team and the TACOM Life Cycle Management Command further helped define requirements, logistics and fielding needs in order to standardize equipment and provide a central point from which to replace equipment through the DLA, which provides the latest equipment for the handlers and the kennels.

FULLY EQUIPPED

For the first time, Army handlers have fully equipped sets that help them keep the dogs healthier, safer and more able to accomplish their mission. In the past, units and handlers purchased a lot of their own equipment ad hoc through catalogs, online and at pet shops. Now, ARDEC engineers working with their counterparts at TACOM for logistics and fielding support have delivered four different types of equipment sets to 41 active Army MP and engineer units with MWDs across the world.

Because each piece of equipment is standard and has a NATO stock number, units needing to replenish their equipment as the result of attrition or damage can do so easily through DLA. In addition, the Army can save money through larger buys of standardized equipment.

The obedience course set contains equipment that helps the dogs meet the requirement to be certified for agility and remain well-trained. Items include crouch tunnels for the dogs to run through, stairs and A-frames to run up and down, as well as walkways to run across and windows to jump through.

The facility set includes equipment to maintain the dogs' health and training, such as food and medication scales, feeding pails, bite suits and other attack

training aids in addition to reward toys. MWDs are organized in different units that accommodate nine, 18 or 30 dogs, depending on the number authorized for that location. Each location receives a small, medium or large facility set, depending on the size of the unit.

VETERAN VETERINARIANS

The canine first-aid set provides canine medical supplies to the handlers, who are trained as first responders for their MWDs. Handlers take the sets with them when they deploy to render first aid if the dog gets injured or needs attention. The set includes bandages, tracheotomy kits, intravenous equipment and a flexible stretcher, along with numerous medications. The Veterinary Corps provides controlled medications when the dog teams are deployed on missions.

Labels for the items and their locations in each bag are standard.

The handler set contains what is needed for the full support and care of the dog: leashes, grooming equipment, collapsible feeding bowls, harnesses and transportation kennels. The portable kennels currently in use are open-air and are kept in the barracks with troops so that the temperature can be controlled.

COOL DOGS

Military handlers have praised the WDKS. Just like Soldiers, MWDs need proper rest in an environmentally controlled shelter when deployed to locations where the temperature could get very hot or very cold, in order to perform at peak levels and provide maximum capability while on missions. The rest is not optimal, however, if the MWD is housed in quarters with people. This knowledge drove the requirement for a deployable kennel.

In Afghanistan, where MWDs have often been deployed, summer temperatures soar to 120 degrees Fahrenheit, and winter temperatures dip into the teens. Mix in blinding sandstorms and other environmental challenges, and one can appreciate the importance of adequate military shelter not only for Soldiers but also for MWDs. To keep MWDs healthier and more comfortable during deployments, the PdM CEH integrated product team is fielding the WDKS for all environments.

The new WDKS will have a shelter with a forced-air system that circulates fresh air in the absence of natural breezes—heated air during extreme cold and cooled air during extreme heat. In accordance with Veterinary Corps requirements, the operating temperature inside the kennel is a minimum of 45 degrees Fahrenheit when the temperature outside the kennel is



HOME BASE

The PdM CEH is fielding this WDKS for all environments. It includes a forced-air system that circulates fresh air and moderates temperatures in extreme climate conditions. Designed for easy transport, the WDKS can be assembled by two people in less than 15 minutes with no tools. (Photo courtesy of PM CCS)



MISSION READY

PM CCS ensures that Army handlers have fully outfitted training kits, including an obstacle course like this one, to help them keep MWDs ready for any mission. (U.S. Army photo by SGT Samuel Northrup, 7th Mobile Public Affairs Detachment)

5 degrees. When the temperature is 120 degrees outside, the inside temperature cannot exceed 85 degrees.

In addition to the shelter, the WDKS includes a run, or exercise area, that allows dogs to stretch their legs. The dogs access the run area through a hinged door that lets them enter and exit the shelter as they please. Thus the dog can be exposed to daylight while remaining in a secured area.

The kennels are an expeditionary capability; the length of a mission determines what type of kennel is used. On missions of up to 30 days, the dogs stay in transportation kennels that do not include the dog runs. The new deployable kennel houses dogs on missions that last 30 to 180 days. Beyond 180 days, the dogs stay in brick-and-mortar structures.

The WDKS can be used independent of the “run” area and is designed to be transported on quick notice on the back of a truck. If a Soldier needs to take the dog to a forward operating

base, he or she can remove the run and take only the shelter if the mission will be under 30 days. The WDKS is modular; two people can assemble it in less than 15 minutes with no tools. The kennels are 48 inches long by 24 inches wide by 40 inches high. The attachable run is 6 feet long by 4 feet wide by 4 feet high.

SNIFFING OUT EXPLOSIVES

The Air Force is DOD’s executive agent for MWDs, responsible for procurement and training. It provides all services with standardized capabilities through the MWD program. However, the services are responsible for the equipping, maintaining and follow-on training of their MWDs. Depending on the mission, training may include explosive detection. Thus MWDs must be trained and certified in detecting both military-grade and homemade explosives, and must be recertified annually.

Training uses live samples of the actual explosives, even though procuring these is logistically challenging for a number of reasons, including uneconomical quantities of scale, varying shelf life and



LEARNING TO OBEY

A veterinary technician in a protective bite suit helps train an MWD as the handler issues a command. The Army designated the working dogs and the equipment as an official program of record, establishing a budget to procure and sustain equipment sets needed for mission readiness. (USAF photo by TSgt Erik Gudmundson)

hazard classifications. For this reason, the Product Directorate for Support Munitions within PM CCS is responsible for ensuring that the MP detachments and engineering units that need these scents have them. If the scents are not available for training, the dogs cannot meet their annual certification standards.

CONCLUSION

The MWD has been and continues to be a valuable partner to the Soldier while in garrison and in harm’s way while deployed. The value of MWDs is greater than ever, especially in this era of asymmetric warfare, in which the enemy makes regular use of improvised explosives. The MWD remains the most reliable explosive detection capability available to the military.

As the result of the judicious efforts of PEO Ammunition and PM CCS, MWDs and their handlers have standardized equipment to meet their requirements and a system that helps the handlers acquire and replace equipment easily. This consistently allows handlers to focus on the care of their partners and the mission they do so well, ensuring that these vital assets are always ready to serve as a “Soldier’s best friend.”

For more information, go to <http://www.pica.army.mil/pmccs/MainSite.html>.

For a historical tour of AL&T over the past 53 years, go to the Army AL&T magazine archives at <http://asc.army.mil/web/magazine/alt-magazine-archivel>.

MR. FRANK ALTAMURA was the FoMWDE project officer for PM CCS, Picatinny Arsenal, NJ. He is currently the deputy product manager for nonstandard ammunition for PEO Ammunition’s Project Manager for Maneuver Ammunition Systems. He holds an M.S. in mechanical engineering from the Stevens Institute of Technology and a B.S. in mechanical engineering from the New Jersey Institute of Engineering. He is Level III certified in program management and in systems planning, research, development and engineering – systems engineering, and is a member of the Army Acquisition Corps.



Office of the Assistant Secretary of the Army (Acquisition, Logistics and Technology)

As of 5/18/15



* Deputy for Medical Systems. Receives acquisition oversight but reports to the Surgeon General

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“One key feature, as far as I’m concerned, is that as we build our requirements, we need to understand how much is enough to get us the capability we want.”

MG Cedric T. Wins
Deputy Director,
Army Capabilities Integration Center

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