2017

Major General Harold J. "Harry" Greene Awards *for* Acquisition Writing

Continuing In His Footsteps

Major General Harold J. "Harry" Greene Awards for Acquisition Writing honor a champion of Army acquisition and its workforce.

by Lt. Gen. Paul A. Ostrowski

With the fourth annual Major General Harold J. "Harry" Greene Awards for Acquisition Writing, we continue to recognize the outstanding contributions of our military and civilian professionals—as well as other interested authors—who, through their critical thinking, impactful research and analytical writing, submit essays, articles and opinion pieces to influence and shape the ongoing dialogue about Army acquisition. The entries this year were impressive, and I want to thank our distinguished panel of judges for its exceptional work in selecting the winners and honorable mentions in each category.

With these awards, we remember a leader who left an unfading mark on us all. We remember fondly his boisterous laugh and voice echoing as he jovially said, "Get back to work!" A hallmark of Harry Greene's leadership was the professional growth and development of his team. He was a champion for his organization and his workforce. In fact, each year there are many submissions to this competition from those who worked for Maj. Gen. Greene, were mentored by him, and vividly recall his lively spirit and lasting commitment to provide Soldiers with the best equipment in the world.

I remember that Harry Greene had a unique quality of being able to always see the bigger picture and keep what was best for the Army at the center of everything he did. And with every success, he was generous in sharing the credit. "In every job I had, we got things done that I think made our Army better, and it was done by other people. … All I did was try to pull people in the right direction and they went and did great things," Greene said in 2009 at the Aberdeen, Maryland, promotion ceremony marking his rise from colonel to brigadier general. "I know it was truly you guys and gals that did the work the Army recognized today, and for that I thank you." His many contributions to Army acquisition, logistics and technology, and the Soldiers we serve, are everlasting.

It was Aug. 5, 2014, when Maj. Gen. Greene paid the ultimate price in service to our nation while on assignment as the deputy commanding general of the Combined Security Transition Command – Afghanistan. The shock and sadness at the tremendous loss of this highly decorated Soldier, Army acquisition leader and friend was felt across our workforce, throughout the Army and around the world, and was shared with his immediate family. His dedicated service spanned 34 years.

This special supplement of Army AL&T magazine showcases the 2017 winning authors and those who received honorable mentions in the competition's four categories: Acquisition Reform; Future Operations; Innovation; and Lessons Learned. My congratulations to the authors showcased here, and my very best wishes to all who participated in the fourth annual Major General Harold J. "Harry" Greene Awards for Acquisition Writing. I also want to express my appreciation to family, friends and colleagues who supported the authors in their important work.

2017 Major General Harold J. "Harry" Greene Awards for Acquisition Writing

The winners and honorable mentions are:

Category: Acquisition Reform/ Better Buying Power

Winner: Creating a Defense Acquisition Consulting Team

Author: **Capt. Christopher W. Piercy** serves as acquisition staff officer, Air Force Installation Contracting Agency, Operating Location Air Combat Command (OL-ACC), Joint Base Langley-Eustis, Virginia. He supports the Air Force's largest and most complex OL contracting portfolio by providing contract clearance reviews and policy oversight to 22 ACC contracting activities, which award and administer $2.3 billion in contracts annually in support of global operations.

Abstract: Throughout history, well-intentioned patriots have written laws, policies and regulations to combat incompetence or unethical behavior in government acquisitions to prevent the misuse of taxpayer money. Unfortunately, we've reached a point where the bureaucracies designed to protect us have become so entangled with conflicting, overly complex and administratively burdensome requirements that we're slowing down decision-making, stifling innovation and ultimately hindering our warfighting capabilities. Better communication and collaboration with working-level acquisition professionals and working-level lawmakers may be a simple and productive step in the right direction toward meaningful reform. By creating a Defense Acquisition Consulting Team, DOD can better inform lawmakers of the effects each year's National Defense Authorization Act will have on the acquisition community and the warfighter.

Honorable Mention: A Model and Process for Transitioning Urgent Acquisition

Authors: **Mr. Stephen F. Conley** has an MBA in information systems from City University of Seattle and a bachelor's degree in industrial engineering from Lafayette College. He is a Defense Acquisition University (DAU) Senior Service College graduate, a Harvard Senior Executive Fellow and a retired Soldier. He is currently the director of the Acquisition Life Cycle Cell for the U.S. Army Communications-Electronics Research, Development and Engineering Center.

Dr. Craig M. Arndt serves as senior research fellow and professor of systems engineering at Defense Acquisition University. He is recognized as an international expert in biometric systems, human computer interface, sensors and sensor systems, image and signal processing and artificial intelligence. Dr. Arndt holds a Doctor of Engineering in electrical engineering from the University of Dayton, an M.A. in national security and strategic studies from the U.S. Naval War College, an M.S. in human factors engineering from Wright State University, an M.S. in systems engineering from Wright State University and a B.S. in electrical engineering from Ohio State University. He is a Licensed Professional Engineer and a Certified Human Factors Professional, and holds acquisition certification in systems engineering, science and technology management, test and evaluation and program management.

Abstract: When the secretary of defense, a combatant commander or a combat unit in theater determines an immediate capability need, DOD and its acquisition community pushes bureaucracy aside to support the

warfighter. The requirements process changes from a Joint Capabilities Integration and Development System to an Operational Needs Statement or Joint Urgent Operational Needs Statement. Urgent acquisition policy focuses on getting capability to the field. Yet, when an urgent capability is determined to be so successful and so useful that it should be fielded across an entire service, there is no formal transition process. This study advances a model for urgent acquisition that can inform DOD Instruction 5000.02 with respect to establishing needed processes for transitioning urgent acquisition initiatives into programs of record. The review of policy and literature has led to the creation of a potential program model for urgent acquisition transition. This model may serve as a template to support further professional discussion with the hope of helping program managers avoid inefficiencies and incorporating the results into DOD 5000.02 policy.

Category: Future Operations

Winner: Future Operations: Tactical Power for Multi-Domain Battle (MDB)

Author: **John M. Spiller**, Lt. Col. USA (Ret.), holds an M.S. from the University of Southern California and a B.S. from the United States Military Academy at West Point. He is Level III certified in program management and has more than 22 years of acquisition experience. He is serving as a support contractor for Augustine Consulting Inc. for the Project Manager for Expeditionary Energy and Sustainment Systems within the Program Executive Office (PEO) for Combat Support and Combat Service Support.

Abstract: In his preface to the U.S. Army Operating Concept "Win in a Complex World," Gen. David Perkins, commanding general of the U.S. Army Training and Doctrine Command, challenges us all: "One of our most important duties as Army professionals is to think clearly about the problem of future armed conflict. That is because our vision of the future must drive change to ensure that Army forces are prepared." This future warfighting article addresses what some would consider a niche topic—tactical power for multidomain battle. Reality is, tactical power cuts across all six Army warfighting functions; tactical power is an enabler that must be integrated into the future combined arms fight. Future tactical power—microgrids and hybrids—offers significant operational and logistical benefits.

Honorable Mention: Ready for Future Operations: Establishing an Organic Depot to Maintain the Army's Premier Aerial Sensor System

Authors: **Lt. Col. Kecia Troy** is the product manager for Electro-Optic/Infrared Payloads and is responsible for the cost, schedule and performance of a broad portfolio of payloads that provide intelligence, surveillance and reconnaissance capabilities. She holds an M.S. in global supply chain management from Syracuse University and a B.A. in economics from Duke University. Troy is Level III certified in program management and Level II certified in information technology.

Ms. Carla Miller serves as the product support manager (PSM) for the Product Manager for Electro-Optic/Infrared Payloads within the PEO for Intelligence, Electronic Warfare and Sensors. As PSM, Miller is responsible for managing the integrated product support elements required to field and maintain the readiness and operational capability of all the sensors within the portfolio. Miller is Level III certified in life cycle logistics, successfully completed the DAU Executive Product Support Managers Course (LOG 465) and holds an MBA in management from Hawaii Pacific University.

Mr. Joshua Erlien serves as the chief of logistics for the Electro-Optic Technology Division within the Naval Surface Warfare Center, Crane Division. Erlien functions as the Multi-Spectral Targeting Systems (MTS) Enterprise lead, helping establish interservice efficiencies for new MTS capability development, acquisition and sustainment. He is Defense Acquisition Corps certified, with a B.A. in military management and program acquisition from American Military University.

Dr. Christina Bates provides contract support as a strategic adviser, planner and strategic communications expert to various organizations within the Army acquisition and research, development and engineering communities, including the Project Manager for Terrestrial Sensors and the Night Vision and Electronic Sensors Directorate. Bates holds a Ph.D. in communication with an emphasis on organizational communication and behavior from Arizo-

na State University; a J.D. from Boston University; an M.S. in mass communication, with distinction, from Boston University; and a B.A. in sociology and communication, cum laude, from Boston College.

Abstract: For the first time in our nation's history, our armed forces have waged battle with a new enemy—an enemy in the form of non-state actors engaged in asymmetric warfare. The acquisition and sustainment of the types of capabilities necessary to successfully engage in asymmetric warfare have stressed, but simultaneously strengthened, the Army's ability to do so in a rapid, effective and efficient manner. These successes, however, ushered in new and different challenges for the Army, including its reliance on industry to maintain and sustain some weapon systems. This reliance on industry, and the risks associated with it, were brought into sharp focus in early 2014, when a team of sensor experts from the Project Manager for Terrestrial Sensors set out to establish (or "facilitize") an organic depot to maintain one of the Army's premier aerial sensor systems, the Common Sensor Payload. During the process, the team overcame various hurdles and developed best practices as it implemented the four pillars of facilitization—securing technical manuals and testing procedures; securing hardware and test equipment; establishing and optimizing the supply chain; and training and transferring capability to an organic industrial base. Formally launched in May 2017, the organic depot now provides maintenance support for all of the services, and as such is a shining example of the efficiencies espoused in Better Buying Power 3.0.

Category: Innovation

Winner: Network Assisted GPS … Coming Soon to a Precision Fire Mission Near You!

Author: **Mr. Paul Manz** serves as chief scientist for PEO Ammunition at Joint Center Picatinny, New Jersey. He is a multiple-certified senior member of the Army Acquisition Corps and certified Lean Six Sigma Black Belt with over three decades of experience spanning the entire materiel development life cycle. He holds several patents and is the recipient of numerous prestigious awards including the 2016 USD(AT&L) Workforce Individual Achievement Award for Engineering, the Precision Strike Association's Richard H. Johnson Technical Achievement Award and the National Defense Industrial Association Firepower Award.

Abstract: GPS is a simple yet effective tool that enables many military position, navigation and timing related capabilities used to maintain combat overmatch against the enemy, including weapons and precision guided munitions (PGMs). Unfortunately, if these weapons and PGMs are located in a vertically challenged terrain environment (i.e., at the bottom of a deep valley in Afghanistan or in an "urban canyon" location), they may not be able to "see" and rapidly "hear" the required minimum number of GPS satellites in the sky during certain times of the day. This effectively can prohibit the use of GPS-based PGMs from such locations. Network Assisted GPS is an innovative system-of-systems solution that overcomes this problem and enables PGMs to "see" and "hear" GPS shortly after being fired—even in the presence of almost full terrain masking.

Honorable Mention: Seeking Innovative Ways to Restore Our Warfighters

Authors: **Ms. Kristy Pottol** is project manager of the Tissue Injury and Regenerative Medicine Project Management Office (TIRM PMO) of the U.S. Army Medical Materiel Development Activity, Fort Detrick, Maryland, and also serves as the program manager for the DOD BioFabUSA Institute effort. She holds an MBA from Regis University, an M.S. in accounting with an emphasis on information systems from the University of North Carolina Wilmington and a B.S. in physics with an emphasis in biophysics from East Carolina University. She is Level III certified in program management.

Mr. John Getz is a product manager in the TIRM PMO. He also serves as deputy program manager for the DOD BioFabUSA Institute effort. He holds a B.S. in biology with emphasis in chemistry from Millersville University of Pennsylvania. He is Level II certified in program management.

Abstract: The U.S. Army Medical Materiel Development Activity's Tissue Injury and Regenerative Medicine Program Management Office is tasked with a nearly impossible acquisition mission: to restore form, function and appearance to the wounded warfighter after catastrophic injury. The development costs are

high, the programs are risky, the timelines are long, the commercial market is small and an enterprise-wide requirement is, to say the least, challenging to write. However, for the TIRM PMO team, this is where innovation, opportunity and possibility thrive. The TIRM PMO looks to amplify DOD's Manufacturing Innovation Institute (now branded as Manufacturing USA) investment by utilizing a "whole-of-government" approach as a force multiplier and tapping into the recent successes found within the exciting field of regenerative medicine. Through this innovative new BioFabUSA endeavor, significantly more will be accomplished, and in a much faster time frame, by working together rather than competing against each other—it is truly a win-win situation for everyone.

Category: Lessons Learned

Winner: Driving Out "The Stupid" – Leveraging IT Lessons Learned from DOD and Industry

Author: **Col. Richard Haggerty** grew up in San Diego and enlisted in the U.S. Army as a senior in high school. After four years, he accepted a Reserve Officer Training Corps scholarship and was commissioned a second lieutenant in 1993. Over his 30-year career, Col. Haggerty has flown attack helicopters and served in various command and staff positions in the conventional Army and special operations forces. He currently leads a project office supporting test and evaluation, joint training, special operations and cyber. He has operational and combat deployments to Kuwait, Bosnia, Thailand, Iraq and Afghanistan.

Abstract: "Driving Out 'The Stupid' – Leveraging IT Lessons Learned from DOD and Industry" recounts one project manager's efforts to leverage the lessons learned and best practices from DOD and industry applied to an Acquisition Category I information technology-based program. The paper summarizes the convergence of these lessons learned into three core principles that drove the acquisition strategy and currently steer the team's daily focus on cost, schedule and performance:

1. Maximum use of acquisition tailoring.
2. Iterative capability drops.
3. Organizational culture.

Honorable Mention: The Top Five Lessons I Learned While Working at Amazon.com Inc.

Author: **Lt. Col. Rachael Hoagland** is currently an assistant executive officer in HQDA CIO G-6. Previously, she served as a Training with Industry Fellow at Amazon.com Inc. She has held assistant project management jobs in the U.S. Special Operations Command and Project Manager Tactical Radios within PEO for Command, Control and Communications – Tactical. Before entering the Army Acquisition Corps, she taught at the United States Military Academy at West Point and held several roles as a military intelligence officer.

Abstract: The Top Five Lessons I Learned While Working at Amazon.com Inc.: (1) Location matters: Project management offices need to be in locations where we can attract diverse, young and energetic talent; (2) Yes works: It is time to change our culture from a "no" organization to a "yes" organization; (3) Custom versus configurable: Configurable software products offer customers the ability to take advantage of all the innovations industry has to offer; (4) Requirements change: Building in flexibility to our plan lets us react to unexpected changes and take advantage of technological breakthroughs; and (5) Companies care: Companies are not only focusing on hiring veterans, they also are focusing on providing them an education.

Major General Harold J. "Harry" Greene Awards for Acquisition Writing Distinguished Judges

Robert E. Armbruster Jr., Maj. Gen. USA (Ret.), Defense Acquisition University (DAU) faculty member and former commander, U.S. Army Test and Evaluation Command (ATEC)

Vincent E. Boles, Maj. Gen. USA (Ret.), Instructor, DAU

Charles A. Cartwright, Maj. Gen. USA (Ret.), DAU faculty member and former program manager, Future Combat Systems

Professor John T. Dillard, academic area chair for acquisition, Graduate School of Business and Public Policy, Naval Postgraduate School

Professor Raymond D. Jones, Graduate School of Business and Public Policy, Naval Postgraduate School

Roger A. Nadeau, Maj. Gen. USA (Ret.), senior vice president, American Business Development Group and former commanding general (CG), ATEC

Kurt A. McNeely, Col. USA (Ret.), chief, Warfighter Central, Enterprise and Systems Integration Center, U.S. Army Armament Research, Development and Engineering Center

Mr. Kris Osborn, managing editor, Warrior Maven

Dana J.H. Pittard, Maj. Gen. USA (Ret.), vice president, Defense Programs, Allison Transmission

Richard G. Trefry, Lt. Gen. USA (Ret.), Association of the United States Army (AUSA) senior fellow and former Army inspector general

Louis C. Wagner, Gen. USA (Ret.), AUSA senior fellow and former CG, U.S. Army Materiel Command

Joseph L. Yakovac, Lt. Gen. USA (Ret.), senior counselor, The Cohen Group, and former ASA(ALT) military deputy and director, Army Acquisition Corps

Category: Acquisition Reform/ Better Buying Power

WINNER

Creating a Defense Acquisition Consulting Team

By Capt. Christopher W. Piercy

Disclaimer: The views and opinions expressed or implied in this essay are those of the author and should not be construed as carrying the official sanction of the Department of Defense, Air Force, F-35 Joint Program Office, or other agencies or departments of the U.S. government.

Background

In 2009 I commissioned into the Air Force as a Second Lieutenant and was assigned the Air Force Specialty Code (AFSC) 64P, which designated me as a Contracting Officer. As a Contracting Officer it is my responsibility to support the warfighter by acquiring the supplies, services, and weapons systems necessary to defeat our enemies and protect our citizens. It is also my responsibility to spend congressionally appropriated American tax dollars wisely and abstain from practices that result in fraud, waste, or abuse. I have served at Moody Air Force Base in Valdosta, GA, Camp Leatherneck in Helmand Province, Afghanistan, Incirlik Air Base in Adana, Turkey, and at the F-35 Joint Program Office in Arlington, VA. Most recently, I had the opportunity to participate in a Mid-Level Development Program at the Air Force's Contracting Headquarters in the Pentagon. During this program, I met with Senate Armed Service Committee (SASC) Professional Staff Members (PSMs) in order to discuss the recently drafted fiscal year (FY) 2018 National Defense Authorization Act (NDAA). I also witnessed a weekly meeting of the Defense Acquisition Regulation (DAR) Council where updates to the Defense Federal Acquisition Regulation Supplement (DFARS) were being discussed and drafted for revision. It is during these two most recent experiences that I realized an opportunity for realistic and meaningful acquisition reform.

Problem

Each year the NDAA is drafted by Professional Staff Members (PSMs) with numerous competing interests, influences, and motivations. PSMs are frequently contacted by industry representatives and other non-government agencies with requests for changes to the law; some even submitting verbiage their organization would like to include in the next NDAA draft. Although PSMs have diverse backgrounds and impressive resumes, many lack extensive experience in Federal or Defense Acquisition. As a result of their lack of acquisition experience and outside-the-government influences, revisions and updates are made to the NDAA that are not in the best interest of the Government, the Department of Defense (DoD), the warfighter, or the tax payer. If the PSMs have specific questions for the DoD, they work through military Legislative Liaison personnel to staff questions through senior ranking military officers or defense officials. Through the inherent nature of staffing (or requiring multiple layers of review), answers can often be watered down to the most basic or vague response. Additionally, the staffing process takes time in order for multiple reviews to be conducted. The more detailed the response, the longer the delay. Also, questions do not always flow down to the working-level or appropriate subject matter expert(s), resulting in less than complete responses. Decisions are then made by PSMs with potentially inadequate, misleading, delayed, or outdated information.

Solution

Create a Defense Acquisition Consulting Team (DACT) to serve as advisors for the Armed Services Committee (HASC/SASC) Staffers during their drafting of the annual National Defense Authorization Act (NDAA). The team should consist of competitively selected working level employees with diverse experiences and backgrounds in government acquisition. It is recommended the group consist of technical experts in Program Management, Contracting, Finance, Legal, Logistics, and Engineering from each of the defense services. Team members should have a minimum of 10 years' experience in their specialized fields with reputable track records of unwavering integrity and exceptional communication skills. It is also recommended each service send both military and civilian representation to enhance diversity of thought and experience. The consulting group would then be available on an

as-needed basis to advise and assist PSMs as they develop and draft the NDAA. The DACT could research acquisition related topics for the PSMs and utilize their professional networks to gain additional insight into complex subjects.

Outcome

The anticipated outcome of creating the Defense Acquisition Consulting Team is the creation of more favorable and executable Acquisition laws, regulations, and policies. Laws established in the NDAA drive changes to the DFARS and FAR. Per the DFARS Operating Guide (www.acq.osd.mil), the current estimated timeline for publishing a change to the DFARS is 12 months. Much of the 12 months is spent in DAR Council, Office of Federal Procurement Policy (OFPP), and Office of Management and Budget (OMB) review. During these reviews, acquisition professionals attempt to reconcile laws from the NDAA with current acquisition policies and procedures. In theory, if laws were drafted after consultation with the proposed DACT's input, they would be more in-line with the concerns of the acquisition reviewers, leading to a more expeditious review process. The DACT's feedback and advice could also prevent conflicting or inexecutable laws as well as laws or policies that would put government acquisition professionals at a severe disadvantage when negotiating or contracting with major defense corporations or contractors operating in expeditionary (or deployed) locations. DACT feedback to PSMs would also be dramatically faster than the current staffing processes. The increase in candid, accurate, and speedy information would likely increase trust and thereby strengthen relationships between the Department of Defense and Congress.

Example

One example of an unfavorable update to the NDAA is Section 823 of the Senate Armed Services Committee's proposed FY18 NDAA, "Limitation on Unilateral Definitization."

For those that may not be familiar, a "unilateral definitization" is an action that can only take place after an Undefinitized Contract Action (UCA) has been issued. A UCA is when the Government authorizes a contractor to begin work based on a "Not to Exceed" dollar amount prior to reaching a negotiated agreement on the final price of a contract action with the contractor. UCAs are primarily used for urgent situations when work must begin immediately and cannot wait for a negotiation or contract award process to complete. However, after work begins the Government and contractor must continue the contracting process in order to negotiate a final price. If an agreement (or "definitization") is met, definitization is considered "bilateral" (or mutual). However, if the Government and contractor cannot reach an agreement, the Government has the right per FAR 16.603-2(c)(3) to determine a reasonable price of the contract action without the contractor's consent. This is referred to as a "Unilateral Definitization." I witnessed a Unilateral Definitization while working at the F-35 Joint Program Office. After 14 months of good faith negotiations, a determination was made that it was in the best interest of the Government to unilaterally definitize a $6.1 Billion contract with Lockheed Martin Aeronautics Company for the Low Rate Initial Production (LRIP) Lot 9 purchase of 57 F-35 aircraft. The Program Office made the determination that all negotiation resources had been exhausted in an attempt to reach a mutual agreement with the sole-source contractor, and that the Government's award determination was fair and reasonable for the scope of effort based on significant and thorough cost and pricing data. If the contractor disagreed with the Government's assessment, they maintained the right per Disputes Clause 52.233-1 to appeal the Government's decision. They did not appeal.

However, less than one year following this unilateral award decision, the Senate Armed Services Committee proposed the following verbiage in Section 823 of their FY18 NDAA draft:

The committee recommends a provision that would apply limitations and a notice and wait period to all undefinitized contractual actions of $50.0 million or greater. Such limitations would require that if an agreement is not reached on contractual terms, specifications, and price by a date certain, the contracting officer may not unilaterally definitize those terms, specifications, and price over the objection of the contractor until the head of the agency approves the definitization in writing, the contracting office provides the written approval to the contractor, and the head of the agency notifies the congressional defense committees of the approval. The contract modification unilaterally definitizing the action should not take effect until 60

calendar days after the congressional defense committees have been notified.

Unfortunately, should this proposed section of the NDAA become law, it would further delay the progress of an already lengthy acquisition process in order for political bureaucracy and influence to pressure contracting officers to accept deals they may not otherwise determine to be fair and reasonable. Such delays and pressures are not beneficial to the warfighter or the taxpayer. In the example of the F-35 unilateral award determination, an already 14 month negotiation would have been extended several additional months had the Section 823 language already been incorporated into law. Additionally, Program Office resources would have inevitably been applied to the drafting of additional justification documents and answering 60 days' worth of questions from the agency head and defense committee members. Such strains on personnel resources would not only have resulted in delayed completion of the LRIP 9 efforts, but would have also hindered progress on other coinciding contract actions, such as ongoing LRIP 10 negotiations for an additional 92 F-35 aircraft.

Solution Applied to the Example Problem

In the case of the Section 823 Limitation on Unilateral Definitization example, I believe a DACT could have provided greater insight to SASC PSMs on the effects the recommended language will have on Acquisition professionals. By utilizing personal experiences, such as the F-35 example, the DACT could advise the PSMs on where processes are already sufficient and therefore have no need for additional oversights, and where they are inadequate and in need of improvement. The PSMs I spoke with during my Mid-Level Development Program experience explained how they are interested in acquisition reform and expediting lengthy procurement processes by removing unnecessary bureaucratic barriers. Yet, the Section 823 language contradicts their desired outcome by potentially adding unnecessary reviews that will further burden an already detailed acquisition structure designed to ensure fairness for both parties engaged in negotiations.

Conclusion

According to the SASC's FY18 NDAA Executive Summary, "Congress has for the last 55 consecutive years passed the National Defense Authorization Act, which authorizes funding and provides authorities for the US military." This is quite an amazing feat considering the political discord and divisiveness our country has often experienced during the same timeframe in history. To me, this success rate illustrates the importance we all place on National Defense regardless of political leanings. It also demonstrates the importance of unity. We simply accomplish more and are our best selves when we work together as a nation. It is in this same spirit of unity and collaboration that I recommend the creation of a Defense Acquisition Consulting Team. I believe such a team, when working alongside those on Capitol Hill, will develop more innovative, effective, and executable acquisition reforms than what has historically passed within the current framework. Greater reform will enable us all to better support the warfighter, protect our national treasures, and ultimately defend our nation and its sovereignty.

Capt. Christopher W. Piercy *currently serves as an Acquisition Staff Officer, Air Force Installation Contracting Agency, Operating Location Air Combat Command (OL-ACC), Joint Base Langley-Eustis, Virginia. He supports the Air Force's largest and most complex OL contracting portfolio by providing contract clearance reviews and policy oversight to 22 ACC contracting activities which award and administer $2.3 billion in contracts annually in support of global operations.*

In October 2009, Capt. Piercy graduated from Officer Training School at Maxwell Air Force Base, Alabama and commissioned as a Second Lieutenant in the contracting career field. As a contracting officer, his duties included Flight Team Lead, Flight Commander, and Procurement Contracting Officer. Prior to his current position, Capt Piercy served as an Executive Officer for the Deputy Program Executive Officer at the F-35 Lightning II Joint Program Office in Arlington, Virginia where he coordinated worldwide travel, prepared official General Officer level correspondence, and interfaced with senior staff at the Department of Defense and other civilian and international military equivalent agencies.

In August 2011, Capt. Piercy deployed to Camp Leatherneck, Afghanistan as a Contingency Contracting Officer in support of Operation Enduring Freedom.

HONORABLE MENTION

A Model and Process for Transitioning Urgent Acquisition

By the following authors:

Mr. Stephen F. Conley

Dr. Craig M. Arndt

Since the start of the Global War on Terrorism, the acquisition community has been focused on providing Quick Reaction Capabilities (QRC) to Warfighting units in theater. Some of this equipment is found to be so effective that it is worth keeping and fielding to the entire service. When a service decides that a QRC is worth keeping, the capability must transition and become an enduring capability otherwise known as a formal Program of Record (POR). The Department of Defense (DoD) has struggled with how to execute this transition for years. This paper provides a conceptual process to transition a QRC to a POR.

In a 2016 Defense Acquisition, Technology and Logistics (AT&L) magazine article, Mr. Kendall, Under Secretary of Defense for Acquisition, Technology and Logistics, stated that "DoD Instruction (DoDI) 5000 series guidance does not address the process of the transition of QRCs to PORs" (Kendall, 2016, p. 5).

The process to equip a unit with a QRC is documented in DoDI 5000.02 along with the process for fielding a POR. The policy for determining if a QRC is to become a POR is known. But when a program manager (PM) is given the mission to transition a QRC to a formal POR, processes are misaligned and inefficient. For example, a QRC does not typically have a POM funding line to support resource allocation decisions. In addition, the acquisition program office is tasked with developing a litany of documents required to support a POR.

Policy has bifurcated traditional and urgent acquisition and there is no document that attempts to explain transition between the two processes. For instance, the 2017 DoDI 5000.02 Change 2 describes both the traditional and the urgent (rapid) acquisition systems but does not provide direction on the transition of urgent programs to traditional programs. In addition to the overarching policy laid out in the 5000 series, the Army has several regulations that govern specific aspects of the acquisition systems. Army Regulation 71-9, Warfighting Capabilities Determination (AR 71-9, 2009), prescribes, identifies, determines, and integrates policies of required warfighting capabilities. Army Regulation 73-1, Test and Evaluation Policy, prescribes implementing policies for Army test and evaluation (T&E) activities and the 2015 Department of the Army Memorandum on the nonstandard equipment (NSE) Army Requirements Oversight Council (AROC) Process. These documents provide extensive guidance on both traditional and urgent acquisition but like DoDI 5000.02 do not provide significant guidance on the Army rapid acquisition systems transition.

This paper used the disparate literature to support the current DoDI 5000.2 and created a model and process for transitioning urgent acquisition initiatives into PORs. The model is intended to help acquisition leaders decide on a specific tailored program model to transition a QRC to an enduring capability. The following recommendations are made to set the stage for further discussion and potential research on the topic of urgent acquisition.

First, the deliberate acquisition process builds towards milestone (MS) C while the urgent acquisition transition process would back into a MS C. To do this, codifying the terminology and process steps is necessary to alleviate confusion.

Second, to successfully transition a QRC to POR, aligning the major processes, [Joint Capabilities Integration and Development System (JCIDS); the Planning, Programming, Budgeting and Execution System (PPBES); and the Defense Acquisition System (DAS)] is a must. The Army's efforts to align the major processes on requirements, acquisition and budget through their Nonstandard Equipment (NSE) Army Requirements Oversight Council (AROC) and Strategic Portfolio Analysis Review (SPAR) events is a current example that enables a potential program model for

urgent acquisition. At the NSE AROC, if the urgent program receives the disposition decision to transition a QRC to POR an AROC Memorandum (AROCM) must designate a Program Executive Office (PEO) take charge of the new program. If a SPAR decides to keep the rapid program and field it to the Army, the Army Acquisition Executive or designee would need to create a POR with an Acquisition Decision Memorandum (ADM). This should be done at a MS D. MS D would be a milestone decision authority (MDA) decision that defines for the transitioning NSE a tailored list of required documentation to meet MS C. With the requirements, acquisition, and budget processes now aligned the path forward has been shaped for success and a PM has everything necessary to drive towards a MS C. The urgent acquisition transition process would look something like figure 1 below.

Recommendations

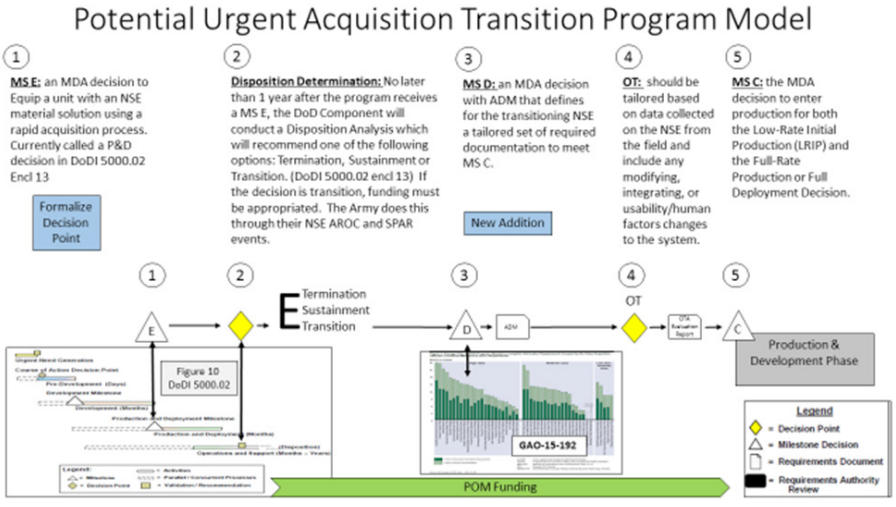
These recommendations are provided as a starting point for senior acquisition professionals to consider when discussing the next update of DoDI 5000.02.

Lexicon. It is recommended that different terminology be used with each separate process of the DAS via the concept of precision in language. The deliberate process would use the terms fielding and POR. The intent of the deliberate acquisition process is to field a POR to an entire service. The urgent process would use the terms equipping and QRC. The intent of the urgent acquisition process is to equip a QRC to a unit. Equipping vs fielding and QRC vs POR create a lexicon to eliminate terminology and process confusion within a dual acquisition system. It keeps it simple.

Milestone E (MS E). Acquisition policy has formalized both a "Deliberate Acquisition" process and an "Urgent Acquisition" process. Following the lexicon recommendation above the acquisition language must also separate the major decision points of these processes. The Deliberate Acquisition process begins with MS A and builds through MS B ending with MS C. At MS C the program gets a fielding decision for an entire service which carries the process through sustainment and final disposition.

The Urgent Acquisition process begins with an Operational Needs Statement (ONS) or Joint Urgent Operational Needs Statement (JUONS) and drives towards an equipping decision for a specific unit. In enclosure 13 of DoDI 5000.02 this decision is called the production and deployment milestone. This paper recommends the milestone be formally named MS E. MS E would be the decision to equip a unit with an NSE material solution using the urgent acquisition process. The equipping decision would be limited to the amount needed to complete the entire requirement under urgency. NSE material is defined as, "equipment that has not been type-classified, is not an acquisition program or component of a program, and has typi-

FIGURE 1 Potential Urgent Acquisition Program Model



cally been procured to support an urgent or emergent operational need." (Anderson, 2015, p. 2) Changing the name forces the community to separate the two processes: deliberate and urgent. It sets the tone and intent of the two processes. Unlike the deliberate process that builds a new capability from MS A to MS C, the urgent process equips a unit quickly at MS E and if later determined works backward to a MS C if the service needs it as an enduring capability.

Disposition Determination. Enclosure 13 of DoDI 5000.02 states that no later than one year after the program receives the production and deployment milestone, the now recommended MS E, the DoD Component will conduct a Disposition Analysis which will recommend one of the following options: Termination, Sustainment or Transition. This paper recommends that the DoDI go one step further. The DoD Component must also align the PPBES with the DAS appropriating funds to enable the QRC transition to POR. The Army's AROC and SPAR efforts are a current example of how to align these processes.

Milestone D (MS D). The second milestone of this potential urgent capability acquisition process would be Milestone D formalizing the decision to transition to a POR. We recommend that to prepare for a MS D, the PM and staff would focus on tailoring the business, technical, and support strategies, and associated documentation. Another prerequisite to MS D would be for each service to develop decision points that document the transition of the urgent capability to new Programs of Record thus aligning the Defense Management process for requirements, budget, and acquisition. MS D would empower the MDA to tailor a number of program aspects: reduce documentation by authorizing waivers; set developmental and operational testing to prepare for a full material release, review contracting, and more. This tailoring effort would minimize what the QRC would have to prepare to reduce program risk wherever possible. The results of MS D would be to create a POR from the QRC and focus this new POR on a path to a MS C fielding decision.

Mandate disposition decision as handoff point. Currently, most organizations involved with urgent acquisition are primarily focused on just getting equipment to the field. These organizations should remain the proponent for the urgent capability until the component level disposition decision point. If the QRC is to become a POR, this decision point becomes the handoff from the urgent acquisition organization to its associated deliberate acquisition organization, typically a PEO.

Mandate Data collection to shape testing. Organizations involved with equipping a unit with a QRC should be required to collect developmental and operational data in preparation for the component level disposition decision. This should be done in conjunction with the appropriate operational test agency (OTA). AR 73-1 already has the Army's OTA, the Army Test and Evaluation Command, writing a C&L report for the production and disposition decision or MS E.

Aligning the Defense Management processes. The Army organizations involved with urgent acquisition should work with the Training and Doctrine Command to codify an updated capability document to replace the ONS or JUONS. This would successfully shape the requirements process for transition. Army organizations involved with urgent acquisition should work with the appropriate PEO to ensure cost estimates and funding profiles are understood and can be inserted into the PPBES. The Army's Rapid Capabilities Office is a good example: "The Rapid Capabilities Office is a total Army effort that will leverage capabilities and expertise from across the service, especially the Army staff, program executive offices, training and doctrine community, intelligence community and science and technology community." (Stalder, 2016) This would provide information about the QRC to support the component level disposition decision and shape the OT needed if the QRC were to transition to a POR.

In 2016, Mr. Kendall issued the challenge that: "DoD Instruction (DoDI) 5000 series guidance does not address the process of the transition of QRCs to PORs" (Kendall, 2016, p. 5). This 2017 paper shows that there is enough current guidance in piece-parts available to create a QRC to POR transition process and update DoDI 5000.02. DoD can meet this challenge and close this gap if its Acquisition Senior Leaders choose to.

References:

Anderson, J. (2015). Interim policy memorandum: Non-

standard equipment (NSE) Army Requirements Oversight Council (AROC) process [Memorandum]. Washington, DC, Department of the Army.

Kendall, F. (2016, July-August). Improving acquisition from within. Defense AT&L, 45(4), 2–7. Retrieved from http://dau.dodlive.mil/files/2016/06/Kendall.pdf.

Stalder, J. (2016). Army launches rapid capabilities office. Retrieved from U.S. Army website: https://www.army.mil/article/174290/army_launches_rapid_capabilities_office.

***Mr. Stephen F. Conley** has a bachelor's in Industrial Engineering from Lafayette College and an MBA in Information Systems from City University. He is a Defense Acquisition University Senior Service College graduate, Harvard Senior Executive Fellow and retired Soldier. He is currently the Director, Acquisition Life Cycle Cell for the U.S. Army Communications-Electronics Research Development Engineering Center.*

***Dr. Craig M. Arndt** has extensive experience as a senior executive and technology leader in the research, engineering and defense industries, with extensive experience as an innovative leader in industry, academic and government. Dr. Arndt currently serves as Senior Research Fellow and Professor of Systems Engineering at the Defense Acquisition University. He is often called on as an expert to chair major program reviews, and lead new programs, proposals and technology development.*

As a senior scientist at the Air Force Labs and the Air Force Institute of Technology, Dr. Arndt led the development of advanced control systems, as well as imaging and modeling systems for aircraft, smart bombs, and aircraft systems. As an engineer, scientist, inventor, and engineering manager at a number of leading defense contractors, Dr. Arndt was responsible for developing a wide range of communications, sensors, and counter terrorism technologies and systems. Dr. Arndt has led and managed business units, companies, and engineering organizations of all sizes located throughout the United States and internationally. As a program manager he has managed programs ranging from research grants to Category 1D major Department of Defense acquisitions.

Dr. Arndt is recognized as an international expert in biometric systems, human computer interface, sensor(s) and sensor systems, image and signal processing, and artificial intelligence. As an active member of the academic and professional community, he has served as a technical expert for the Army and Defense Science Boards, the CNO's Strategic Studies Group (SSG), the National Science Foundation, the International Standards Organization (ISO), the IEEE, and other public and private technical organizations, and several major universities, and is past Vice President of the Virginia Society of Professional Engineering.

Dr. Arndt holds five university degrees including a Doctor of Engineering in Electrical Engineering from the University of Dayton, a Master of Arts in National Security and Strategic Studies form the US Navy War College, a Master of Science in Human Factors Engineering and a Master of Science in Systems Engineering from Wright State University, and a Bachelor of Science in Electrical Engineering, Ohio State University. Dr. Arndt has extensive publications of his research and holds 7 US patents.

In addition, Dr. Arndt is a Licensed Professional Engineer, a Certified Human Factors Professional, and holds acquisition certification in Systems engineering, Science and technology management, Test and Evaluation and Program Management.

Category: Future Operations

WINNER

Future Operations: Tactical Power for Multi-Domain Battle (MDB)

By John M. Spiller

Thinking About Warfighting

As a young Captain, I was assigned to the Command and General Staff College's Doctrine Branch just two years after the 1982 Field Manual 100-5, Operations, was published. This was the birth of AirLand Battle doctrine – and as the only Captain there, I always got to flip transparencies on the overhead projector. At the time, I did not realize how lucky I was because I got to soak in the magnificent warfighting discussions. AirLand Battle profoundly changed the operational and institutional Army and culminated in a quick Gulf War victory.

Change bigger than AirLand Battle is coming. Army Chief of Staff GEN Mark Milley "is convinced … the character of war … is undergoing fundamental, profound and significant change."[1] In his preface to the U.S. Army Operating Concept (AOC), "Win in a Complex World," TRADOC Commander GEN David Perkins challenges us all: "One of our most important duties as Army professionals is to think clearly about the problem of future armed conflict. That is because our vision of the future must drive change to ensure that Army forces are prepared."[2] Acquisition professionals must read the AOC and think about how we can provide a future warfighting edge to Soldiers who will fight in "an environment that is not only unknown, but unknowable and constantly changing."[3]

The Tactical Power Problem

Tactical power technology is a poster child for waste—fuel-gulping and inefficient. U.S. Government Accountability Office (GAO) Report 09-300 summarized the problem: "DOD reports that the single largest battlefield fuel consumer is generators, which provide power for base support activities such as cooling, heating, and lighting."[4] Who hasn't lived through a tactical generator dying at the absolute worst time? Losing lights, air conditioning and computers are always inconvenient. In the future, it won't just be lights going out in the Command Post, it will be lights going out on MDB – losing links to cyber, bandwidth, electronic measures/countermeasures, and sensors.

Tactical power is the foundation … a key enabler for MDB. Who is thinking through this future?

The Right Tactical Power Supporting MDB

We must start the thinking and professional discussion on an Army and Joint vision for the right tactical power supporting MDB. The AOC tells us "the U.S. Army's differential advantage over enemies derives, in part, from the integration of advanced technologies with skilled Soldiers and well-trained teams."[5]

In parallel with the AOC, emerging solutions to the tactical power problem are:

- Providing advanced, more reliable power technology that automatically matches power supply to demand (optimized to reduce logistics demand).
- Providing the right mix of power-skilled Soldiers and well-trained teams in the Brigade Combat Team (BCT).

Problem Scope

Generator technology—and limitations—has been well understood for 125 years. Generators operate most efficiently at full load. However, it is virtually impossible to keep a stand-alone generator fully loaded 24/7/365 due to constantly changing user demand—ever-changing demand drives the fuel-gulping waste that is the crux of the tactical power problem. Numerous surveys from operations in Iraq and Afghanistan show that most generators are inefficiently loaded at 30% or less.

Generator size (kW)	1/4 load (gal/hr)	1/2 load (gal/hr)	3/4 load (gal/hr)	full load (gal/hr)
30	1.3	1.8	2.4	2.9
40	1.6	2.3	3.2	4
60	1.8	2.9	3.8	4.8
200	4.7	7.7	11	14.4

Using the generator fuel consumption chart[6] illustrates the scope of the problem and the operational impact.

If user peak demand (aka "load") is 60 kilowatts (kW), the most efficient choice would be one 60kW generator at full (100%) load, which consumes 4.8 gal/hr. You get the same 60kW by running four 60kW generators at 25% load; however, at 25% load, all four generators consume 1.8 gal/hr. 1.8 * 4 = 7.2 gal/hr. Simple math reveals yearly fuel requirements:

- One 60kW gen @ 100% load: 4.8 gal/hr * 24 hrs/day * 365 days/yr = 42,048 gal/yr.
- Four 60kW gens @ 25% load: 7.2 gal/hr * 24 hrs/day * 365 days/yr = 63,072 gal/yr.

How efficient is it to deliver 21,000 more gallons a year to support one small 60kW load? Put into perspective, GAO Report 09-300 documented "each day, over 2 million gallons of fuel alone [were] supplied to U.S. forces in Iraq and Afghanistan."[7]

The U.S. Marine Corps Expeditionary Energy Office monitored tactical generator energy demand in Afghanistan during 2012.[8] It documented a demand

Representatives of PM Expeditionary Energy and Sustainment Systems (E2S2) providing AMMPS stand-alone generator training to 173rd Airborne Brigade Combat Team (Sky Soldiers) prior to the unit's 2012 Afghanistan deployment. (U.S. Army photo courtesy of PM E2S2 Forward)

profile with wide variations in generator load (5% to 100%). The 100% peak load happened for just one hour a night during the winter when generators were powering heaters; peak load is the driver for choosing generator size. However, during the spring and fall (six months), the load on the same generator varied from 5% to 35%. The generator ran 24/7/365 with an inefficient yearly average load of 32%. Warfighting conclusion? Generators running at inefficient loads = waste. This waste is a limitation of a stand-alone generator, which is a "brute force" way to provide tactical power. This inefficiency is untenable for MDB when fuel deliveries will be to smaller, dispersed units.

Solution: Advanced Technology

How do we provide the right tactical power to support MDB? Think about your utility company, which automatically tracks your home demand and automatically provides power to meet your demand—you only pay for the kilowatt hours you use. Intelligent power technology exists today to take utility-like efficiency to the battlefield: tactical microgrids and hybrids. At Network Integration Exercise 14.2, the military-standard Advanced Medium Mobile Power Sources microgrid (four networked 60kW generators) automatically matched power to demand and provided these operational and logistics footprint advantages:[9]

- Improved reliability = better operational capability for warfighters. Only one power outage in 2.5 months despite one of the generators running out of fuel 32 times; the power outage only occurred when two generators ran out of fuel simultaneously.
- When demand was low, one, two or three generators were automatically turned off (not burning any fuel); yielding 30%+ fuel savings over status quo.
- Four networked generators replaced status quo (11 stand-alone generators). Microgrid operating hours were only 26% of status quo, extending time between oil changes and unplanned maintenance on fewer generators.

A "hybrid" is a generator paired with advanced battery storage so the generator can be turned off while batteries handle the demand. Hybrids would be a viable solution for smaller mobile units executing MDB. Hybrids also enable silent watch.

Solution: Skilled Soldiers and Well-Trained Teams

Since 1947, the Corps of Engineers has been the Army's lead for power.[10] Force structure changes made in the early 1980s caused Corps of Engineers' utility units manned with power planners and operators to disappear. Unbelievably, our Army is the only Service with no uniformed electricians providing battlefield support.

The Corps of Engineers boasts highly-trained uniformed electricians, (MOS 12P) and the schoolhouse, curriculum and instructors are in place today. What if just a few 12Ps were assigned to each BCT to serve as unit power planners? Combined with non-electrician power specialists and operators already in the BCT, the 12P electricians could lead a well-trained BCT power team. Generator mechanics/power specialists (MOS 91D) could continue repairs and assist with grid set-up/tear-down. The 12Ps could also supervise/enforce BCT-wide microgrid/hybrid training and licensing, which would increase operator skills and safety.

Tactical power is not integrated into today's combined arms fight. If the BCT Commander wants logistics or bandwidth, he turns to CGSC-graduate Majors on his staff. If he wants power, the Army's answer today is, "We all should make energy-informed decisions." When a task is "everybody's job," it ends up being "nobody's job." Energy-informed decisions imply power decisions

Military-standard AMMPS 60kW generator with microgrid switchbox mounted on a trailer. Up to six 60kW generators can be networked into a microgrid. (U.S. Army photo courtesy of PM E2S2.)

are as easy as turning off lights at home.

Imagine this future mission order: "Our BCT is deploying to combat in foreign megacities … need to tap into the host nation power grid, but have our organic generators tied in as backup." This mission order is going to require a CGSC-graduate Major on the BCT staff with 12P planners. The Assistant Brigade Engineer[11] could integrate power into the military decision making process to ensure integration in the MDB combined arms fight.

In April 2012, the Joint Requirements Oversight Council and the Army Requirements Oversight Council approved the Army's Operational Energy for Sustained Ground Operations Initial Capabilities Document. Appendix E within lists 16 Operational Energy capability gaps—many of which would be closed or mitigated by the aforementioned slight organization tweaks.

Change … Requires Change

GEN Perkins closed his AOC preface with another challenge: "Leaders at all levels must … not allow bureaucratic processes to stifle them."[12] Our Army should address a current institutional bureaucratic process that hinders building capabilities to support MDB. Below are examples of language taken from draft TRADOC Capability Development Documents (CDD):

- New capability will not require any additional personnel, new MOS or ASI for operation of the system.
- Current MOS and leader development, training instruction, and resources … shall not significantly increase due to the introduction of new capability.

This language is a "stop sign" to the important truth in the AOC that "the U.S. Army's differential advantage over enemies derives, in part, from the integration of advanced technologies with skilled Soldiers and well-trained teams."[13] Professionals understand downward trends in force structure and budget are constraints, but there are zero-sum force structure options to professionally consider.

The AOC has specified power tasks for our future: "New technologies enable increased efficiency and reduced demand through lower fuel consumption, efficient storage and power generation."[14] Advanced technology—microgrids and hybrids—offer significant, quantifiable operational and logistics footprint advantages to future MDB. Slight organizational tweaks could put skilled leaders and Soldiers in BCTs so they can build well-trained power teams at the point of need. The timing is right for the Corps of Engineers to reassume its historical lead for power and to update policy devoid of substantive changes for decades.

If our Army gets MDB power right, it will be a combat multiplier and will save lives of American Soldiers not yet born.

Endnotes

1 *Milley, Mark A. GEN. "Radical Change Is Coming: Gen. Mark A. Milley Not Talking About Just Tinkering Around the Edges," edited by Rick Maze. Association of the United States Army, 13 December 2016, https://www.ausa.org/articles/radical-change-coming-gen-mark-milley-not-talking-about-just-tinkering-around-edges.*

2 *U.S. Army Operating Concept (AOC), "Win in a Complex World," 31 Oct 2014, p. iii (3) AOC, iii.*

4 *U.S. Government Accountability Office (GAO) Report 09-300. "DOD Needs to Increase Attention on Fuel Demand Management at Forward-Deployed Locations." U.S. Government Accountability Office, 20 February 2009, http://www.gao.gov/products/GAO-09-300, Highlights page.*

5 *AOC, p.15.*

6 *"Approximate Diesel Fuel Consumption Chart." Diesel Service & Supply, http://www.dieselserviceandsupply.com/Diesel_Fuel_Consumption.aspx.*

7 *GAO Report 09-300, p. 1.*

8 *USMC Expeditionary Energy Office, "Mobile Electric Hybrid Power Systems (MEHPS) Brief to Industry," 31 January 2013.*

9 *Metered NIE 14.2 data from Project Manager Expeditionary Ener-*

gy and Sustainment Systems (PM E2S2) Government Engineers

10 Memorandum, War Department (pre-DoD), WDG-SP, 18 August 1947, subject: Engine Generators.

11 Field Manual (FM) 3-96, "Brigade Combat Team", 8 Oct 2015, para 3-101, p. 3-20.

12 AOC, p. v.

13 AOC, p.15.

14 AOC, p.37.

John M. Spiller *(Lt. Col., Retired) has a BS from the United States Military Academy (1979) and a MS from the University of Southern California (1986). A certified Level-III Program Manager with more than 22 years of acquisition experience, he is currently serving as a support contractor (Augustine Consulting, Inc.) for Project Manager Expeditionary Energy and Sustainment Systems, PEO Combat Support and Combat Service Support.*

HONORABLE MENTION

Ready for Future Operations: Establishing an Organic Depot to Maintain the Army's Premier Aerial Sensor System

By the following authors:

Lt. Col. Kecia Troy

Ms. Carla Miller

Mr. Joshua Erlien

Dr. Christina Bates

Industry Sustainment of Army Systems

For the first time in our Nation's history, our armed forces have waged battle with a new enemy – an enemy in the form of non-state actors engaged in asymmetric, irregular warfare. The development, acquisition, fielding, and sustainment of the types of systems (and capabilities) necessary to successfully engage in asymmetrical warfare have stressed, but simultaneously strengthened, the Army's ability to do so in a rapid, effective, and efficient manner. These successes, however, ushered in new and different challenges for the Army. The Army is expected to continue to excel in a fiscally-challenging environment.

Coupled with fiscal constraints, are the challenges resulting from more than a decade's worth of rapid system procurements, including the Army's heavy reliance on industry for maintenance and sustainment of weapon systems. This reliance on industry, and the risks associated with it, were brought into sharp focus in the spring of 2014, when a team of sensor experts within the Project Manager Terrestrial Sensors (PM TS) decided to explore the feasibility of facili-

tizing an organic sustainment depot to maintain and repair one of the Army's premier aerial sensor systems—the Common Sensor Payload (CSP). Over the following three (3) years, the Team would develop and execute an aggressive plan to conduct supportability analyses and eventually stand-up a fully-functioning, efficient sustainment depot that maintains and repairs the Army's entire CSP fleet. In the course of planning and implementing, the Team overcame numerous challenges, effectively navigated various stakeholder relationships, and established best practices that may be readily applied by others considering the establishment of an organic sustainment capability.

Taking the Leap to Establish Organic Sustainment Capabilities

The Product Manager Electro-optic/Infrared Payloads (PdM EO/IR—a subordinate command of PM TS) manages the CSP program. The CSP is one of the Army's primary aerial sensor systems for gathering intelligence, surveillance, and reconnaissance (ISR) data. It is an electro-optic/infrared (EO/IR) sensor that is integrated on the Gray Eagle Unmanned Aircraft System (UAS) and operates throughout the Gray Eagle's flight mission profile and operational altitude. The CSP provides targeting video to the Gray Eagle operator and lases the target for laser tracking munitions. As such, CSP enables collection of actionable combat information across the entire battlespace, improving the Commander's ability to concentrate superior combat power against the enemy at the decisive time and place. Furthermore, the CSP capabilities are common with similar unmanned aerial systems of the same class, promoting the potential for Joint commonality, as well as acquisition and better buying power advantages.

The CSP was traditionally maintained and repaired by the original equipment manufacturer (OEM), Raytheon, at the CSP Depot located in McKinney, Texas. With an eye toward reducing costs without sacrificing quality or system performance, PdM EO/IR began exploring the feasibility of transitioning responsibility for the CSP's maintenance and repair from Raytheon to the Government (i.e., PdM EO/IR).

In early 2014, PdM EO/IR established the Joint Payloads Integrated Product Team (JPIPT) to identify and implement organic repair and multi-Service efficiency initiatives with a focus on consolidation of efforts among the Services. The JPIPT comprised members from PdM EO/IR, Naval Surface Warfare Center, Crane Division (NSWCCD), US Air Force MQ-9 Special Projects Office (SPO), and the Communications-Electronics Command Lifecycle Management Command (CECOM LCMC) G8 Cost and Systems Analysis Office. The JPIPT worked its way through several challenging tasks to establish an organic maintenance depot. These tasks included developing the CSP Depot Sustainment Comparison Analysis; creating and briefing the Depot Execution Strategy; and ultimately working in close coordination with the other Services to stand up the organic depot.

To understand the various options available for effectively maintaining the CSP, the JPIPT's first step was to conduct a Depot Sustainment Comparison Analysis. Doing so included the following steps: extracting average repair labor hours per work breakdown structure (WBS) element; determining government equivalent labor rates for each WBS element; modeling different depot repair scenarios; applying appropriate labor cost categories for each element in the scenario; and performing sensitivity analyses to test variance in Wartime and Peacetime operational tempo (OPTEMPO) and government overhead rates. To complete these steps, the JPIPT partnered with various team members across the Services and within the CECOM Lifecycle Management Command (LCMC). The effort was truly collaborative and cross-functional.

The analysis resulted in several findings. The most significant findings revealed that government rates to operate the depot would be far less than contractor rates, with no negative impact to performance. Findings also indicated that a specific and narrow need existed for reach back engineering support from the OEM. This support could ultimately be narrowly defined and managed at a very reasonable cost. And, since the depot would be utilized by all of the Services, the costs (both Government and contractor support) would be shared accordingly.

Once the Team's results and interpretations were briefed and approved, it developed the Depot Execution Strategy. The Strategy included the following key elements: approaching depot maintenance in two phases to minimize the risk of observing gaps in depot repair capability (i.e., phase 1: depot reach back

support by leveraging existing contract for original equipment manufacturer (OEM) depot engineering reach back support as needed, and phase 2: implement organic alternative (Government owns every process of depot maintenance)); leveraging existing support equipment procured by the Air Force and Navy; securing a contract for depot activation (including delta support equipment, technical data, and training); and receiving approval to proceed with depot activation by the Assistant Secretary of the Army for Acquisition, Logistics, and Technology (ASA(ALT)). With the Strategy in hand, the Team set out to execute on the four pillars of depot facilitization to stand-up the capability.

The Four Pillars of Depot Facilitization

Standing up, or "facilitizing" an organic maintenance depot includes executing on four pillars of facilitization —securing technical manuals and testing procedures; securing hardware and test equipment; establishing and optimizing the supply chain; and training, and transferring capability to in-house (i.e., Government) personnel. It is important to note that the pillars are interdependent; for example, issues securing technical manuals and testing procedures may negatively impact training and transferring capability to in-house personnel. Therefore, each pillar should ideally be thoroughly addressed to ensure a smooth and successful depot stand-up.

Throughout the stand-up process, the Team encountered and overcame several challenges associated with each pillar. First, as the Team began to gather technical source data to develop technical manuals, it discovered that some technical source data was missing. To address this challenge, the Team collaborated with the OEM, who then provided a dedicated resource with engineering and logistics expertise to supplement technical source data. Together the Team and the OEM subject matter expert (SME) generated robust technical manuals that would serve as the foundation for training and transferring capability to in-house personnel.

Securing the hardware was not difficult, since most (but not all) of the equipment at the depot was already Government owned. However, the establishment of effective configuration management between the Government equipment and the OEM's equipment proved challenging. The Team spent months validating its test procedures against all equipment at the depot, including the OEM's equipment. Moreover, as configuration management efforts proceeded, the associated technical manuals required updating. Leaning forward, the Team also established processes to support gathering future feedback from the OEM on testing procedures in anticipation of future testing changes.

Managing the supply chain proved to be the hardest pillar for the Team. Since it shared its technical data package with all of the other Services, it needed to establish primary inventory control authority (PICA), before it could fully understand the system's supply chain and how best to manage it. Currently, the Army is represented as a user to the Navy on certain CSP parts, while it is represented as the PICA for other CSP parts. To mitigate the risk of the interdependices associated with sharing the PICA roles among the Services, the Team established an IPT in which they discuss and resolve various issues, including those stemming from the sharing of technical data, such as configuration management and obsolescence. In this manner, the Team ensures that the supply chain effectively and efficiently supports depot maintenance operations and contributes to acceptable operational readiness rates for the CSP.

The Depot was formally launched in May 2017 with a ribbon cutting ceremony. (U.S. Army photo)

Ready for Prime Time

What began with a question—"Can we effectively establish an organic depot to maintain the CSP?"—in early 2014 culminated with a clear answer—"yes!", as the CSP Depot formally launched in May 2017. In a short, but busy three years, the JPIPT transitioned what was once a completely outsourced effort to a primarily government operated, fully and successfully functioning maintenance depot for the Army's premier

aerial sensor system. Moreover, the Depot provides maintenance support for all of the Services, and as such is a shining example of the efficiencies espoused in Better Buying Power (BBP) 3.0. These efficiencies will greatly benefit the Army, Air Force, and Marine Unmanned Aerial Systems (UAS), and will also benefit manned intelligence, surveillance, and reconnaissance (ISR) systems including the Enhanced Medium Altitude Reconnaissance and Surveillance System (EMARRS), the Airborne Reconnaissance Low system (ARL) and Guardrail, as well as Aerostats, at a fraction of the previous cost.

Lt. Col. Kecia Troy *is the Product Manager for Electro-Optic/Infrared Payloads and is responsible for the cost, schedule, and performance of a broad portfolio of payloads that provide intelligence, surveillance, and reconnaissance capabilities. She holds a BA in Economics from Duke University and a MS in Global Supply Chain Management from Syracuse University. Troy is Defense Acquisition Workforce Improvement Act (DAWIA) certified Level III in Program Management and Level II in Information Technology.*

Ms. Carla Miller *serves as the Product Support Manager (PSM) for PdM EO/IR Payloads. As the PSM, Ms. Miller is responsible for managing the integrated product support elements required to field and maintain the readiness and operational capability of all the sensors within the PdM EO/IR portfolio. Ms. Miller is Level III Acquisition Life Cycle Logistics certified, successfully completed the Defense Acquisition University Executive Product Support Managers Course (LOG 465) and holds a Master of Business Administration in Management from Hawaii Pacific University.*

Mr. Joshua Erlien *serves as the Chief of Logistics for the Electro-Optic Technology Division within the Naval Surface Warfare Center, Crane Division. Erlien functions as the Multi-Spectral Targeting Systems (MTS) Enterprise Lead helping establish inter-service efficiencies for new MTS capability development, acquisition, and sustainment. He is Defense Acquisition Corps Certified, with a B.A. in Military Management and Program Acquisition from American Military University.*

Dr. Christina Bates *provides contract support as a strategic advisor, planner, and strategic communications expert to various organizations within the Army Acquisition and Research, Development, and Engineering communities, including the Project Manager Terrestrial Sensors and the Night Vision and Electronic Sensors Directorate. Bates holds a PhD in Communication with an emphasis on Organizational Communication and Behavior from Arizona State University; a MS, with distinction from Boston University; a JD from Boston University; and a BA, cum laude from Boston College.*

Category: Innovation

WINNER

Network Assisted GPS … Coming Soon to a Precision Fire Mission Near You!

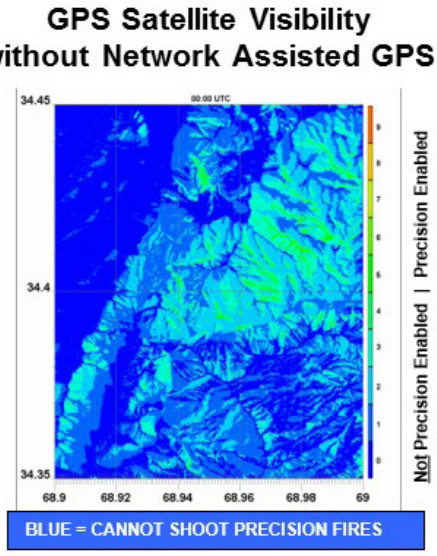
By Mr. Paul C. Manz

Global Position System (GPS) signals are extensively used by a multitude of Army and Joint military products and applications. GPS is highly accurate, affordable, and pervasive. Most typical GPS-based systems automatically listen for GPS signals, use these signals to determine the exact location of the GPS satellites in the sky, and then (when it sees at least four GPS satellites) use this information to precisely determine the system's geo-location coordinates (i.e. X, Y, Z) on Earth. Because these GPS signals contain data from their extremely accurate on-board satellite clocks, they can also be used to synchronize time across multiple systems. Thus, GPS is a simple, yet effective, tool which enables many military position, navigation, and timing (PNT) related capabilities used to maintain combat overmatch against the enemy. These GPS-enabled capabilities include indirect fires which support the Maneuver Commander in performing essential tactical operations such as "Movement to Contact."

The Problem

Knowing where your weapon system is located and where the target is located are two of the five critical requirements for accurate predicted indirect fires. Additionally, many indirect fire Precision Guided Munitions (PGMs) use GPS to deliver lethality exactly where it is required to quickly defeat enemy targets with minimal

FIGURE 1 The Terrain Masking Problem



collateral damage, even when the enemy target is very far away. Unlike most typical GPS-based systems, some indirect artillery and mortar fire PGMs must "hot start" or pre-load the locations where GPS satellites are in the sky (i.e. GPS ephemeris data) in order to rapidly start looking for and navigating off these GPS satellites within a few seconds after exiting the weapon system.

Why is "hot start" GPS data important?

Similar to pulling your car out of the garage after a two week vacation and turning on your vehicle's navigation system (i.e. "cold start"), it can take up to two minutes to acquire and start navigating off of GPS if you don't pre-load this GPS data. Since the time of flight for many such PGMs can be under one minute, this means the PGM may never navigate and can become an unguided "lawn dart."

Where does "hot start" GPS data normally come from?

Usually a handheld Defense Advanced GPS Receiver (DAGR), or other GPS device co-located with the weapon system shooting the PGM, transfers the GPS Satellite information it sees in the sky to the PGM using a specialized Fuze Setter device. Unfortunately, if a weapon system and its co-located DAGR are located in a vertically-challenged terrain environment (ex. at the bottom of a deep valley in Afghanistan or in an "urban canyon" location), the required visibility of at least four GPS satellites in the sky may be terrain-masked during certain times of the day (see Figure 1). This terrain-masking effectively prohibits GPS-based PGMs from being fired (i.e. making the weapon system not "precision capable") since not enough "hot start" GPS satellite data can be preloaded to rapidly acquire, track, and navigate off of GPS.

The Solution

PEO Ammunition, Joint Center Picatinny Arsenal, and its other Army research, development, and acquisition (RDA) partners have designed, developed, and successfully tested an innovative system-of-systems solution called Network Assisted GPS that provides complete "hot start" GPS satellite data for PGMs—even in the presence of almost full terrain masking! Network Assisted GPS takes advantage of multiple, sunk-cost, acquisition Programs of Record across multiple PEOs and deployed across multiple Services. Leveraging these deployed capabilities and combining them with a modest amount of new software "glue", Network Assisted GPS is a reasonable cost, non-traditional program that will dramatically increase the availability of indirect artillery and mortar fire PGMs in vertically-challenged terrain environments.

How does it work?

The US Air Force (USAF) GPS Operations Center (GPSOC) publishes the exact location of the GPS satellites orbiting around the Earth several times each hour on a classified network. Joint Battle Command - Platform (JBC-P) is managed by PEO C3T and similarly has centralized Network Operations Centers (NOCs) at a few key sanctuary locations around the globe. These JBC-P NOCs are always connected to the same classified network as the GPSOC and are also always connected via Satellite Communications (SATCOM) to JBC-P systems on the ground. These terrestrial JBC-P systems are found in most vehicles as well as Tactical Operations Centers (TOCs). The Advanced Field Artillery Tactical System (AFATDS) is co-located with JBC-P in these TOCs. AFATDS is the command and control system that generates fire missions which tell who, what, where, when, and how to shoot enemy targets. AFATDS is connected via tactical terrestrial communications to all targeting systems and indirect fire weapon systems in the area of combat operations.

Network Assisted GPS works by having the JBC-P NOC request the GPS satellite location data contin-

ually published by the USAF GPSOC and "pushes" this small amount of GPS data down to each and every terrestrial JBC-P on a periodic basis whenever SATCOM bandwidth is available. When a Call-For-Fire message comes into AFATDS from a targeting system, AFATDS processes this message and then sends another message to the appropriate weapon system to initiate and conduct an indirect fire mission against a specific target. With Network Assisted GPS, AFATDS also "subscribes" to GPS satellite location and related data from JBC-P over the TOC's Local Area Network (LAN) using the TOC's Data Dissemination Service (DDS). AFATDS subsequently "pushes" this GPS information to all these same weapon systems on a periodic basis. This information includes ALL the potential GPS satellites a weapon system should be seeing on that side of the Earth (i.e. as if its location was not terrain-masked and shooting from a "world is flat" position). Whenever the indirect fire weapon system receives a precision fire mission from AFATDS, it loads ALL this potential GPS satellite location data provided by Network Assisted GPS (i.e. GPSOC to JBC-P NOC to JBC-P to AFATDS to Weapon) onto the PGM in lieu of the much lesser number of satellites usually seen at a terrain-masked firing position.

When the PGM is subsequently fired, it utilizes this "hot start" data to immediately start acquiring GPS satellites as they become visible in the sky. As the PGM rises in elevation and clears terrain-masking features (ex. flies out of the valley and above the ridgeline), it sees more and more GPS satellites. Once at least four GPS satellites come into view, the PGM starts navigating and is now able to complete its precision engagement on the target even when the weapon position location saw less than this minimum number of GPS satellites in the sky.

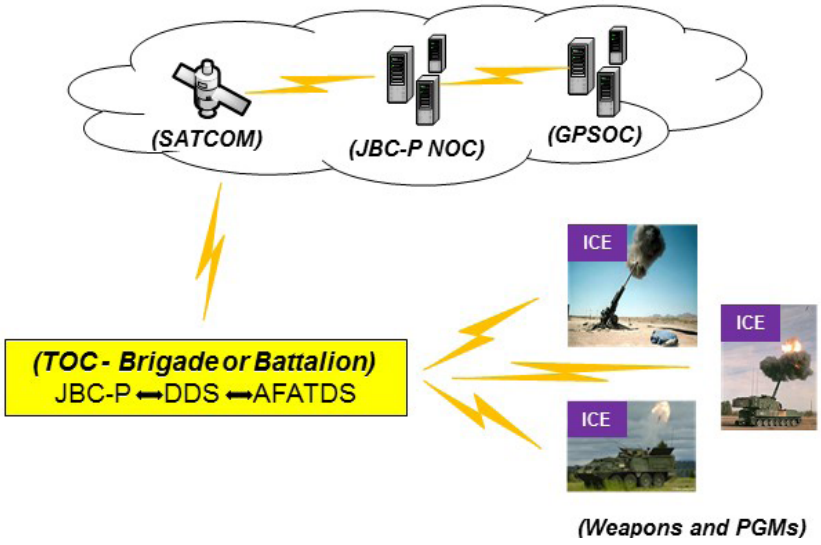
One More Thing

The PGM also needs to know about Ionospheric Correction data (automatically calculated by the DAGR when its sees multiple GPS satellites) since the GPS signals are "delayed" when passing through the Earth's Ionosphere. This "delay" must be reflected in high-precision, accurate, time calculations which are an essential part of using GPS. Network Assisted GPS developed an innovative local-to-the-weapon-system Ionospheric Correction Extrapolation (ICE) software function. ICE can accurately estimate Ionospheric Correction data using only one GPS satellite along with the information passed down from JBC-P through AFATDS to the weapon system. This enables weapon systems to still be considered "precision capable" by AFATDS and shoot GPS-based PGMs when their firing positions are almost completely terrain-masked.

It Works!

The Government conducted a system-of-systems live fire test of all the aforementioned elements of

FIGURE 2 Network Assisted GPS



Network Assisted GPS (see Figure 2). This live fire test was conducted at Yuma Proving Grounds and went a successful 5-out-of-5 precision indirect fire missions using only one real GPS satellite in the sky (i.e. needed for ICE to work) with the balance of "hot start" data provided via Network Assisted GPS.

Since Network Assisted GPS was specifically designed to work automatically in the background when all of its required system-of-systems elements are present, it is totally transparent to the user. Other than general awareness, no special training is required by most warfighters.

Extending the Goodness of Network Assisted GPS

There are many different applications across the Services that can benefit from Network Assisted GPS just as it is built right now. For example, a dismounted warfighter has been under triple canopy jungle for an extended period of time. The warfighter is masked from "hearing" relatively weak GPS satellite signals through the dense tree foliage but is still able to occasionally get stronger communication signals. The warfighter may generally, but not exactly, know where he is but needs more accurate position information to perform the mission. To determine his exact position, the warfighter or one of his platoon mates would usually have to go out into a larger jungle clearing with a reasonable open view of the sky. They would then have to stay in this open clearing for a relatively extended period of time - one or two minutes - to obtain accurate "cold start" GPS position information. This exposed time in the open increases their potential risk to enemy observation and threat of hostile fire. Leveraging Network Assisted GPS and ICE, the warfighter could rapidly obtain "hot start" GPS position information in a much shorter period of time (i.e. single digit seconds) to determine his exact position.

Network Assisted GPS was designed in a modular fashion and can also be modified/expanded to address other critical PNT-related problems and capabilities. For example, the mechanisms and "building blocks" established in Network Assisted GPS for current P(Y)-Code GPS applications can be leveraged to support new M-Code GPS applications as well as GPS augmentation capabilities such as Pseudolites. Both these new sources of GPS signal must similarly be pre-loaded to support precision indirect fire operations. Network Assisted GPS also provides a known reference source of GPS information that can easily be used to determine if the signals being heard are true.

The Bottom Line

Network Assisted GPS … Coming Soon to a Precision Fire Mission Near You!

Mr. Paul Manz *currently serves as chief scientist for PEO Ammunition at Picatinny Arsenal, the Joint Center for Weapons and Ammunition. He is a multiple-certified senior member of the Army Acquisition Corps and certified Lean Six Sigma Black Belt with more than three decades of experience spanning the entire materiel development life cycle from science and technology through production and deployment. He recently won the 2016 Undersecretary of Defense for Acquisition, Technology and Logistics Workforce Individual Achievement Award in Engineering.*

HONORABLE MENTION

Seeking Innovative Ways to Restore Our Warfighters

By the following authors:

Ms. Kristy Pottol

Mr. John Getz

Our Tissue Injury and Regenerative Medicine Program Management Office is tasked with a nearly impossible acquisition mission: to restore form, function and appearance to the wounded Warfighter post-catastrophic injury. The development costs are high, the programs are risky, the timelines are long, the commercial market is small and an enterprise-wide requirement is, to say the least, challenging to write. For our team, this is where innovation, opportunity and possibility thrive.

Our Service Members are counting on us to be as innovative in our problem-solving battle as they are on the front lines, protecting and defending our freedoms.

The U.S. Army Medical Materiel Development Activity has a unique role in the Army acquisition space. As the premier developer of world-class military medical capabilities, USAMMDA is responsible for developing and delivering critical products designed to protect and preserve the lives of Warfighters. These products include drugs, vaccines, biologics, devices and medical support equipment intended to promote readiness and maximize survival of casualties on the battlefield. However, USAMMDA's TIRM PMO also works diligently to support our Service Members returning from the fight; many of whom are scarred both physically and mentally following catastrophic combat injuries.

The TIRM PMO looks to amplify the Department of Defense's Manufacturing Innovation Institute (now branded as Manufacturing USA) investment by utilizing a "whole-of-government" approach as a force multiplier and tapping into the recent successes found within the exciting field of regenerative medicine. Our commitment to cross-coordination among non-Department of Defense government agencies has led to an identification of key barriers in regenerative medicine solutions that currently exist across the nation. This problem list was briefed at the National Science and Technology Council Subcommittee on Advanced Manufacturing in September 2015, on behalf of all agencies funding regenerative medicine. This focused coordination of the industrialization challenges became the catalyst for the newly established DOD Manufacturing Innovation Institute for regenerative medicine.

Only 15 months after the aforementioned briefing, the DOD announced $80 million in funding for the award of their first biomanufacturing effort under the Manufacturing USA program, with an additional $214 million pledged by industry partners. This award was completed and presented to the Advanced Regenerative Manufacturing Institute in Manchester, New Hampshire, to establish, through a public–private partnership, the BioFabUSA institute. This critical endeavor bridges the gap between early scientific research and later-stage product development by strategically advancing critical technologies to enable large-scale tissue product manufacturing efforts. Addressing manufacturing challenges early in the acquisition lifecycle reduces risk, thereby enabling accelerated development of new producible, sustainable and affordable technologies in this rapidly evolving area.

The whole-of-government approach continues to be a key success factor for the regenerative medicine field and for BioFabUSA. Representatives from all Armed Services and across all relevant government agencies, with expertise in some element of manufacturing and testing technologies, are included in the BioFabUSA technical working groups. We have assembled a voluntary intra-government Biomanufacturing Stakeholder's Council to share lessons, successes, vision, goals and networking contacts, so that we can solve difficult problems by working to our collective strengths.

Key leadership from USAMMDA's TIRM PMO is proud to champion this groundbreaking venture. While the focus of BioFabUSA is placed on the manufacturing and testing barriers for tissue engineering, having the oversight of this program embedded within the TIRM PMO ensures alignment with our acquisition programs and helps to leverage value propositions with our industry partners. The BioFabUSA business model mixed with the TIRM PMO's development pipeline ensures that we mitigate development risk, increase opportunities for cost control, and provide thought-leadership in this emerging, regulated landscape. This strategic alignment will inevitably accelerate numerous medical products for treating our wounded Warfighters, which will contribute to Army readiness and save lives on the battlefield of the future.

The DOD's $80M investment in this nascent field has catalyzed a public–private partnership that aims to upend traditional processes for biopharmaceutical development. Innovative public–private partnerships leverage the creativity of the free market and advance DOD objectives. ARMI has carefully selected trust agents via a Board of Directors with long track records of creating products that have positively impacted the world. The seemingly impossible challenge of developing tissue products on an industrial scale while also supporting the needs of our Service Members creates an unprecedented partnership. We fully expect that silos and stovepipes can and will be eliminated in the interest of advancing technologies to bring solutions to our wounded Warfighters.

The implementation of BioFabUSA is aimed to bring together an emerging and fragmented industry with targeted academic research to create a stable and growing tissue engineering industry that will literally change medicine and support Army's challenging medical acquisition programs. To accomplish this, the main thrust of BioFabUSA's diverse membership is focused on eliminating industrial manufacturing technology barriers through problem-solving centered on teaming and the creation of an "industrial commons" workspace. We expect to help promising new products reach the marketplace through a unification of knowledge, materials and equipment that may be shared between large and small organizations — quite revolutionary considering the possibilities that lie ahead.

One of our primary goals is to find novel ways to acquire the necessary products to treat our Service Members and provide the products they need, when they need them, and this program will certainly help to accelerate the delivery of these critical products to the Warfighter. We must be ready, so they can be ready, not only on the battlespace, but when returning home with profound injuries. As part of our mission, the TIRM PMO is called upon to provide the necessary elements and treatments to restore form and function to our severely injured men and women. Therefore, we must seek out ways to source these products, and we are excited about the tremendous potential of the BioFabUSA institute in helping to streamline the process of creating the end products we need.

BioFabUSA is focused on bringing together industry, academia and government to work on problems that are more difficult than any one institution alone can solve — it's about encouraging partnerships to create our essential products and to fill critical medical gaps for Service Members. Through this innovative new BioFabUSA endeavor, we undoubtedly will accomplish significantly more, and in a much faster timeframe, by working together rather than competing against each other — it is a win-win situation for everyone.

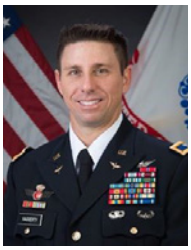
Ms. Kristy Pottol *is project manager of the Tissue Injury and Regenerative Medicine Project Management Office of the U.S. Army Medical Materiel Development Activity, Fort Detrick, Maryland, and also serves as the program manager for the Department of Defense BioFabUSA Institute effort. Ms. Pottol is a certified Defense Acquisition Professional, Program Management Level III, and a member of the Acquisition Corps. She holds a Master of Business Administration degree from Regis University, a Master of Science degree in accounting with emphasis on Information Systems from the University of North Carolina at Wilmington, and a Bachelor of Science degree in physics with an emphasis in biophysics from East Carolina University.*

Mr. John Getz *is a product manager in the Tissue Injury and Regenerative Medicine Project Management Office of the U.S. Army Medical Materiel Development Activity, Fort Detrick, Maryland. He also serves as deputy program manager for the Department of Defense BioFabUSA Institute effort. Mr. Getz is a certified Defense Acquisition Professional, Program Management Level II. He holds a Bachelor of Science degree in biology with emphasis in chemistry from Millersville University of Pennsylvania.*

Category: Lessons Learned

WINNER

Driving out "the Stupid" Leveraging IT Lessons Learned from DOD and Industry



By Col. Richard Haggerty

Imagine yourself as the Project Manager (PM) of an Acquisition Category (ACAT) III basket portfolio who has just been tapped to lead an ACAT I Special Interest cyber-Information Technology (IT) program with direction from Congress to immediately deliver capability to all Cyber Mission Forces (CMF) across the Department of Defense (DoD). Additionally, your first task as the PM is to brief Congressional members and staffers on your plan to execute this program, despite a lack of personnel, a defined requirement document, or an acquisition strategy.

What do you do?

A good place to start is an assessment of applicable Lessons Learned. Unfortunately, these lessons all

point to a spotty track record of government-managed information technology (IT) programs:

a) "Large projects not only fail more often, they deliver less… 50% of IT projects with budgets over $15 million dollars run 45% over budget, are 7% behind schedule, and deliver 58% less functionality than predicted."[1]

b) "The government has wasted billions on botched IT projects that fail to deliver promised – or any – functionality and have been mothballed."[2]

Even Gall's Law clearly warns us that a complex system that works evolves from a simple system that worked. Conversely, a complex system designed from scratch never works and cannot be made to work.

Now what do you do?

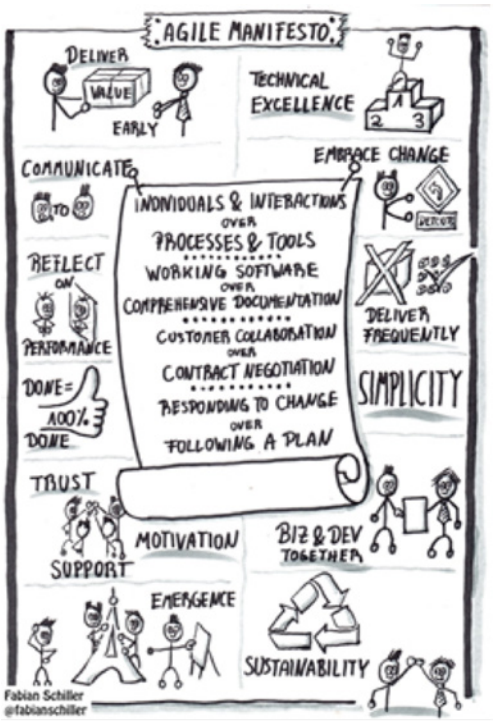
Perhaps an application of industry lessons learned is the answer. As PC computing started to proliferate the enterprise in the 1990's, the average lag between a requirement and software application delivery was three years. DoD's answer to decrease development time was new software development standards and minimal tailoring of acquisition standards. Industry leaders instead sought to keep pace with the market and accelerating technology, but often cancelled projects and/or delivered partial capability in frustration as the gap continually expanded. Out of necessity for corporate survival, Agile was born in industry.

Agile Software Development describes a set of values and principles for software development under which requirements and solutions evolve through collaborative efforts of small self-organizing cross-functional teams.

As Agile evolved over the decades, it found its way into DoD weapons system programs. Yet countless reports and case studies of large-scale IT programs highlight the incongruity between agile development methodologies in industry and the cumbersome bureaucratic governmental processes unable to take full advantage of them.

These government and industry lessons learned drove three core principles for building the Persistent Cyber Training Environment (PCTE) program of record:

FIGURE 1 Agile Software Development Manifesto



a) Maximum use of acquisition tailoring

b) Iterative capability drops

c) Organizational culture

Acquisition Tailoring

PMs often complain that there are too many restrictions in place to streamline programs, or they require special authorities similar to the Army's Rapid Equipping Force or U.S. Special Operations Command's ability to rapidly deliver capability. I respectfully disagree.

a) DoD 5000.01: "MDAs and PMs shall tailor program strategies and oversight, including documentation of program information, acquisition phases, the timing and scope of decision reviews, and decision levels, to fit the particular conditions of that program, consistent with applicable laws and regulations and the time-sensitivity of the capability need."

b) Better Buying Power: "Unnecessary and low-value added processes and document requirements are a significant drag on acquisition productivity and must be aggressively identified and eliminated,"

c) FAR Part 1.102-4: "The absence of direction should be interpreted as permitting the team to innovate and use sound business judgement that is otherwise consistent with law and within the limits of their authority."

There are countless other references encouraging, if not directing, acquisition professionals to tailor programs based on sound business decisions. Unfortunately, the stigma associated with acquisition tailoring insinuates cutting corners, incomplete staffing, and/or excessive levels of risk. It additionally levies demands on a system that was not built for streamlined operations. Program tailoring often requires accelerated staffing, flat decision-making constructs, and requires acquisition leaders to accept some elements of risk that would otherwise be deferred during long and cumbersome staffing processes. It's this organizational discomfort, not restrictive policy that often dissuades acquisition tailoring.

The PCTE Acquisition Strategy outlines a tailored approach to conduct pre-milestone risk reduction activities, then formally enter the acquisition system at Milestone B. During staffing a senior member of an organization tried to convince us to insert a Milestone A into the strategy so the program "looked more traditional and acceptable to the establishment", despite the non value-added time and effort it would bring to the program. This discussion is more representative of the obstacles to acquisition tailoring than the actual policy.

Iterative Capability Drops

Poorly performing projects "have often used a 'big bang' approach—that is, projects are broadly scoped and aim to deliver functionality several years after initiation. This has too often resulted in overdue, ineffective projects that fail to keep up with the rapid pace of technological innovation."[3]

This theme of IT projects collapsing under their own schedule as technology and requirements eclipsed the clumsy acquisition processes was prevalent in numerous reports and case study lessons learned. The solution was best articulated in a 2014 MITRE report that translated the principles of the Agile manifesto into four core elements.[4] These became the driving vision for not only the PCTE acquisition strategy, but the organizational culture.

a) Focusing on small, frequent capability releases

b) Valuing working software over comprehensive documentation

c) Responding rapidly to changes in operations, technology, and budgets

d) Actively involving users throughout the development to ensure high operational value

Using these as a guide, the team kicked off the PCTE program less than seven days after being formally designated by the Army to manage this program of record with an Industry Day that brought in more than 100 companies, organizations, and members of academia. During that same event we also initiated a Cyber Innovation Challenge (CIC) targeting a niche capability within the PCTE requirement; the CIC down-selected paper proposals to seven selected vendors who participated in a week-long demonstration to Cyber Mission Force evaluator. One vendor with considerable experience in the cyber community remarked that "this was the first cyber fly-off we've ever participated in."

The CIC results in Other Transactional Authority (OTA) contract awards to industry. Coupled with efforts under other existing cyber contracts, these CIC efforts feed the first of several pre-Milestone B iterative PCTE capability drops to keep pace with technology, threat, and training requirements while also reducing programmatic risk. The first PCTE CIC OTA awards are scheduled for October 2017, with a second CIC event kicking off in Spring 2018. The programmatics, however, are only one element of success.

Organizational Culture

Managing an ACAT I program without people is challenging, especially during a federal civilian hiring freeze. But it is also a golden opportunity to assemble a team that has the right organizational culture to make a large DoD IT project successful.

A valuable lesson learned articulated in the Defense Acquisition Guide observed that "experience indicates that cultural changes must occur if programs are to implement Agile effectively, and that institutional resistance to these changes can prove especially hard to overcome. However, we believe that with strong leadership, a well-informed program office, and a cohesive and committed government

and contractor team, Agile could enable the DoD to deliver IT capabilities faster and more effectively than traditional incremental approaches."[5]

It's simple to publish a command philosophy or a new policy, but those documents do very little in shaping organizational culture. The PCTE team continues to use the Agile Manifesto to not only guide the program's strategy, but also the organization's culture. At the risk of using trite colloquialisms, every member of the team is brought into a flat organization where personal responsibility, initiative, and creativity are not only rewarded, but mandated. In How the Mighty Fall, Jim Collins expressed it best: "Any exceptional enterprise depends first and foremost upon having self-managed and self-motivated people, the #1 ingredient for a culture of discipline. While you might think that such a culture would be characterized by rules, rigidity, and bureaucracy, I'm suggesting quite the opposite."

In June 2017, while performing the duties of the Undersecretary of Defense for Acquisition, Logistics and Technology, Mr. James MacStravic vowed to drive out what he called "the stupid" from DoD's IT buying practices. Specifically, the department's tendency to apply processes that were designed for complex weapons systems – including massive, slow delivery increments and exhaustive testing procedures. Coincidentally, Mr. MacStravic was the Milestone Decision Authority for PCTE at that time and had just approved the innovative and unconventional PCTE Acquisition Strategy 30 days prior. Without question, he helped shape the organizational culture, as well as the program's strategy.

Driving Out "The Stupid"

Poring over lessons learned and case studies on acquisition programs, most professionals will think to themselves, "how could this have ever happened?" It's only after some time in the seat that PMs realize how easy it is to be the topic of a case study.

As we pored over the lessons learned on large DoD IT efforts, it became clear that the Persistent Cyber Training Environment program had to take an unconventional approach to be successful. We needed to heavily tailor the acquisition process, commit to an Agile-like strategy for iterative capability drops, and shape focus on an organizational culture that could not only think outside the box, but manage a program outside of it.

PCTE has clearly embraced Agile development and is embracing leading edge methods for streamlining this complex program. These efforts are driven by necessity as well as a pure desire to deliver this key capability to Warfighter's.

References:

1 *Bloch, Michael, Blumberg, Sven and Laartz, Jürgen. Delivering Large-Scale IT Projects on Time, On Budget, and On Value." McKinsey, October 2012, http://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/delivering-large-scale-it-projects-on-time-on-budget-and-on-value. Accessed on 10 September 2017.*

2 *GAO-15-290 Report to Congressional Committees, "High Risk Series, An Update." February 2015, http://www.gao.gov/assets/670/668415.pdf. Accessed on 11 September 2017.*

3 *GAO-15-290 Report to Congressional Committees, "High Risk Series, An Update." February 2015, http://www.gao.gov/assets/670/668415.pdf. Accessed on 11 September 2017.*

4 *Modigliani, Peter J and Chang, Su. "Defense Agile Acquisition Guide: Tailoring DoD IT Acquisition Program Structures and Processes to Rapidly Deliver Capabilities." March 2014, https://www.mitre.org/publications/technical-papers/defense-agile-acquisition-guide-tailoring-dod-it-acquisition-program. Accessed on 6 September 2017.*

5 *Modigliani, Peter J and Chang, Su. "Defense Agile Acquisition Guide: Tailoring DoD IT Acquisition Program Structures and Processes to Rapidly Deliver Capabilities." March 2014, https://www.mitre.org/publications/technical-papers/defense-agile-acquisition-guide-tailoring-dod-it-acquisition-program. Accessed on 6 September 2017.*

Figure 1. Schiller, Fabian. "Agile Planet. A Travel Guide to the Agile Universe." learnpub.com, 2 November 2014, https://leanpub.com/agileplanet. Accessed on 7 September 2017.

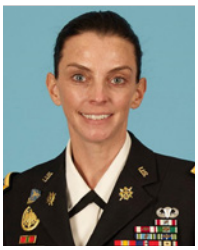
Col. Richard Haggerty *grew up in San Diego, California and enlisted in the United States Army as a senior in high school. After four years he accepted a Reserve Officer Training*

Corps (ROTC) scholarship and was commissioned a Second Lieutenant in 1993. Over his 30 year career, Col. Haggerty has flown attack helicopters and served in various command and staff positions in the conventional Army and Special Operations Forces. He currently leads a project office supporting test and evaluation, joint training, special operations and cyber.

Col. Haggerty has operational and combat deployments to Kuwait, Bosnia, Thailand, Iraq and Afghanistan. He is married to the former Kimberly Way of New Jersey, and they have two sons: Nicholas and Maverick.

HONORABLE MENTION

The Top Five Lessons I Learned While Working at Amazon.com, Inc.



By Lt. Col. Rachael Hoagland

When people learn that I spent a year as a Training with Industry Fellow at Amazon.com, Inc. I get asked, "Did you meet Jeff Bezos? Did you get to work on the drones?" Or, "You must have seen some really cool technology." Yes, I attended quarterly all hands with Jeff Bezos but we never had a one on one conversation. No, I did not work on the drone project. Yes, I did see some really cool technology. Every time someone asked one of the questions I had already been asked a hundred times I asked myself what it was that I was really learning.

The experience was so much more than just seeing a new technology or meeting one person. So, here are my top five lessons learned while working at Amazon.com. I hope these thoughts will provoke discussion and inspire curiosity.

1) Location Matters

I was initially shocked to learn how many people had worked for a large Information Technology (IT) company prior to working at Amazon or were leaving Amazon to go work at another large IT company. The location of Amazon's headquarters in Seattle, WA allowed for talent to move around in different companies without moving physical locations, thus allowing Amazon to recruit the best of the best in their respective fields.

While some may view talent moving between companies as a negative thing, in reality, it's very positive. Having people with diverse experiences work in different companies means that new perspectives and ideas are constantly being generated, rather than relying on those with the same experiences doing the same things, just with a different company name or logo. This made me ask myself, has the Army located our project management offices strategically in the best way?

When it comes to building Army vehicles, locating the project management office near Detroit, MI—home of the American automobile industry—it is absolutely right. But when it comes to information technology, I believe we have miscalculated. It is no secret that Silicon Valley is known for being home to many of the world's largest IT companies, yet the Army has no IT project management offices there. Instead, most of our IT offices are in Aberdeen, MD and Fort Belvoir, VA. These locations cause us to hire employees who are less familiar, and engaged with, the current IT trends, usually a retired military member who owns a flip phone and has no social media account but is willing to stay in the area.

We need to ask ourselves, who do we want building our software? Do we want people who all look the same with the same background and same experience? If the answer is no, then the project management office needs to be in a location which supports more than just the government organization; it needs to be in a location where we can attract diverse, young, and energetic talent.

2) Yes Works

Saying yes is not something Government Acquisition is known for. Maybe it is our training, the type of people we hire, or the way the system is setup, but in government acquisitions the default answer is, "No," and too often, "I can't do that, if I do I will go to jail," with a follow up citation of some statute or regulation that supports their answer. However, the problem is not the statue or the regulation; it is how people choose to interpret and administer them, which leads to processes being implemented that are the same as

they have always been done, even if they are not the most productive or effective. We hire smart people but do not empower them to make changes or experiment with new things, which is why they so often say no.

There were a few key fundamentals I observed at Amazon that supported employees saying yes. First, they decentralized decision making; second, they encouraged teams to self-organize and self-manage; finally, they empowered decision making at the lowest level. Implementing these ideologies would be a major culture shift for most of our program offices, but I think it is important to apply them to government acquisition. It is time to change our culture from a "no" organization to a "yes" organization.

3) Custom versus Configurable

Do we really need a custom product or could we use an industry product and configure it to fit our needs? Configurable software products offer customers the ability to take advantage of all the innovations industry has to offer. Custom software is expensive; development is slow; upgrades are difficult, slow, costly and are sometimes unreliable. These can all cause the government to fall behind the rest of industry relatively quickly. It might seem as though building a custom solution would better fit the requirements, but the opposite may be true. Highly configurable software provides the user with more options, thus allowing them to adapt to changing environments.

4) Requirements Change

When it comes to developing software solutions we often try to plan everything upfront without building in any flexibility. Flexibility lets us react to unexpected changes and take advantage of breakthroughs. While at Amazon I watched how requirements shifted and changed as new breakthroughs were discovered. This kept the speed of development very high.

In government acquisition, we find similar breakthroughs but are unable to take advantage of them because we are not authorized to make changes to our requirements within the program offices. To change requirements there is a drawn out process that often makes the discovery irrelevant because the by the time you get approval the moment for implementation has passed. Changing requirements will empower us to make monumental changes instead of incremental changes.

5) Companies Care

While living and working in Seattle I was able to spend time with military recruiting teams from Amazon, Starbucks, and Microsoft. What I found most encouraging was that the companies not only focused on hiring veterans, they also focused on education. Amazon Web Services (AWS) offers a free AWS Educate membership to transitioning service members and military spouses. Starbucks offers all employees a free college education if they work an average of 20 hours a week. For veterans, they will also pay for one child or spouse to earn their college degree as well. Microsoft provides certifications to transitioning services members that provides 18 college credit hours upon course completion.

Final Thoughts

There are a lot of similarities between the lessons I gained while working at Amazon and those I learned as an Assistant Project Manager in Special Operations Forces Command (SOCOM). A large number of the project management offices are located with the user community. There is a culture of saying "yes," which aids in getting the mission done right as quickly as possible. They decentralize decision-making. Configurable products are the norm. Calculated risk and experimentation are acceptable, which often changes requirements or drives new ones. Finally, there is a considerable focus on education. SOCOM is proof that these processes work within the government construct.

The future of our national security depends upon a culture shift in the acquisition community. We have an obligation to work within the statutory and regulatory requirements, but we also have a responsibility to learn how to govern the processes so that we better meet the user's needs.

Lt. Col. Rachael Hoagland *is currently an assistant executive officer in HQDA CIO G-6. Previously, she served as a Training with Industry Fellow at Amazon.com, Inc. She has held assistant project management jobs in the U.S. Special Operations Command and Project Manager Tactical Radios within PEO Command, Control and Communications - Tactical. Prior to entering the Acquisition Corps, she taught at the U.S. Military Academy at West Point and held several roles as a military intelligence officer.*