2015

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

Honoring a Legacy

This year's winners of the Major General Harold J. "Harry" Greene Awards for Acquisition Writing showcase the talent and creativity that are the hallmarks of the acquisition community to which MG Greene made considerable and lasting contributions

by the Honorable Heidi Shyu

Through the Major General Harold J. "Harry" Greene Awards for Acquisition Writing, we remember a leader who left an indelible mark on us all. Over the course of a 34-year career, Harry brought a unique blend of technical expertise, business acumen and decisive leadership to the Army. I could always count on him to make decisions and tackle problems with sound logic and a clear perspective on what needed priority focus, especially on matters affecting our Soldiers. He was passionate about our responsibility to provide them with the best equipment in the world.

Harry's service, sacrifice and tragic death on Aug. 5, 2014, while serving as the deputy commanding general of Combined Security Transition Command – Afghanistan reminds us of the dedication, commitment and risk our men and women in uniform take to ensure our nation's security. His distinguished career as a Soldier and leader in the Army is solemnly remembered not for how it ended, but for what it achieved.

We honor Harry's legacy, in part, through the annual Major General Harold J. "Harry" Greene Awards for Acquisition Writing. Open to all, this competition is designed to foster a dialog on the way forward for the acquisition community in these challenging times. Each year, we invite participants to share their experiences and bright ideas by submitting articles, essays and opinion pieces in the following categories: Acquisition Reform/Better Buying Power; Future Operations; Innovation; and Lessons Learned. The difficult task of selecting winners and honorable mentions is made easier by the expertise of our senior military and civilian acquisition leaders, who served as reviewers and judges.

This special supplement to Army AL&T magazine showcases the 2015 winning authors and those who received honorable mentions. I often say that we have the greatest workforce anywhere, and this year's results are another reminder of the tremendous talent, creativity and expertise within our community. My thanks and best wishes to all who participated in this competition, and my sincere congratulations to all whose works are included in the pages that follow.

Harry was a scholar and an inspirational leader. His contributions to our Soldiers and the Army will be felt for many, many years to come. This award, and all that it signifies, reminds us of the tremendous debt of gratitude we owe him.

2015 Major General Harold J. "Harry" Greene Awards for Acquisition Writing

The winners and honorable mentions are:

Category: Acquisition Reform/Better Buying Power

Winner: Embracing Requirements Creep and Making Defense Acquisition Agile to Address a Changing World

Author: **Mr. Joe Novick** is the deputy product manager for the Joint Expeditionary Collective Protection Program within the Joint Project Manager for Protection, part of the Joint Program Executive Office for Chemical and Biological Defense. **Mr. Jorge Hernandez** also contributed to the article.

Abstract: Requirements creep should be embraced, not dismissed. Said differently, the ability of acquisition programs to adapt to new threats and environments should be embraced, not dismissed! The variety of adversaries, complex foreign policy, and the speed of technology expansion present an ever-growing number of new threats in a fiscally restrained environment. Yet defense acquisition remains rigid, only able to change course at prescribed junctions. While efforts to rapidly field responses to emerging threats exist, these strategies oftentimes make critical trade-offs that increase management oversight and life-cycle costs in the longer term. How can defense acquisition become more agile to address the changing threat environment? Can the defense acquisition community embrace requirements creep while employing Better Buying Power to streamline acquisition? In order to embrace requirements creep to make weapon systems align better to the changing threat, fundamental changes to the requirements generation process and to the defense acquisition process are necessary.

Honorable Mention: Is Your System Export Ready?

Author: **Mr. Paul Manz** currently serves as chief scientist for the Program Executive Office (PEO) for Ammunition.

Abstract: As part of Better Buying Power (BBP) and its overarching set of acquisition-related imperatives, there has been and continues to be an increased focus on including defense exportability features (DEF) as an inherent part of all DOD systems envisioned for eventual export via foreign military sales (FMS) or direct commercial sales (DCS). Increasing our ability to export defense products has numerous benefits, including greater economies of scale that reduce costs for all customers (including U.S. customers), greater commonality and interoperability with our global partners, and strengthened relationships with our friends and allies. From a national technology and industry base (NTIB) management perspective, these benefits also include strengthening and protecting our own industrial base through expanded DEF-enabled opportunities to meet minimum sustaining rates and maintain profitability in an era where defense spending is decreasing and many smaller-tier companies are exiting the marketplace. The author has defined and currently uses a common communications framework and set of DEF-related terminologies and definitions that can facilitate mutual, efficient understanding among all stakeholders. The exportability readiness level (ERL) is akin to technology readiness level (TRL) and manufacturing readiness level (MRL), and captures the synergy between ERL and the usual TRL and MRL maturity levels desired by a program manager before they choose to integrate a new technology into a program of record.

Honorable Mention: Experience-Based Qualification Standards for the Contracting Workforce

Author: **Mr. Thomas H. Miller** is the program manager for the U.S. Marine Corps Mine Resistant Ambush Protected Vehicle Program.

Abstract: Winston Churchill said: "Gentlemen, we have run out of money; now we have to think." This logic applies to the current DOD fiscal environment: shrinking budgets due to sequestration, but increasing operational requirements due to expanding global threats. DOD needs experienced, business and technology-savvy personnel capable of managing its complex, multibillion dollar programs successfully to provide needed capability to meet the demands of warfighters. It is imperative that the DOD and Army contracting workforce evolve to meet this demand, as they are the point people negotiating and administering the contracts under which most of DOD's work is accomplished. However, the contracting workforce—made up of a mix of highly experienced but overworked senior level personnel and a recent influx of younger, less experienced personnel—is not well positioned to deal with the demands of the current environment, much less the increasingly demanding future. The author outlines a new system that ensures that contracting personnel are qualified, through on-the-job experience and a career path of progressively more demanding experiential assignments designed both to prepare them for their current jobs and to help them plan their future career progression.

Category: Future Operations

Winner: The Sensor Computing Environment Initiative: Achieving Comprehensive Sensor Interoperability for the United States Army

Authors: **Mr. Clair Guthrie** is the Army's Common Operating Environment Sensor Computing Environment (CE) lead, responsible for providing interoperability for 46 Army sensor and command and control systems.

Dr. Christina Bates provides contract support to various organizations within the Army acquisition and research, development, and engineering communities, including Project Manager Terrestrial Sensors and the Communications-Electronics Research, Development and Engineering Center's Night Vision and Electronic Sensors Directorate.

Abstract: As our nation faces existing and emerging threats, and our Army readies itself to win in a complex world, improved situational awareness and a mastery of the battle space will become increasingly important. Sensor CE's pursuit of comprehensive sensor interoperability, and its myriad and significant benefits, will be integral to the Army's ability to access, apply and unlock the full potential of sensor data to take decisive action and ensure combat overmatch.

Honorable Mention: Disruptive Technology: Managing Its Potential Impact on Future Army Operations

Author: **CPT(P) Hassan M. Kamara** is a basic branch armor officer, and an assistant program manager in the Patriot Advanced Capability-3 Product Office in the Lower Tier Project Office of PEO Missiles and Space.

Abstract: This paper studies the potential influence of disruptive technology on future Army operations and the Soldier from a historical perspective. It provides insight into how Army and Acquisition Corps leaders can hedge against technical surprise in future operations. The adversaries of the United States will continue to seek innovative ways to disrupt its technological dominance in land warfare. Shawn Brimley et al "Game Changers: Disruptive Technology and U.S. Defense Strategy" concur that "during the next decade, the rise of new powers and the accelerating diffusion of advanced technology throughout the international system will pose significant challenges to U.S. technological dominance in military affairs." This raises the question: how can the U.S. Army manage emerging technology to prevent technical surprise and complications to future operations? Using the U.S. interwar period (1918-1941) as its case study the paper examines how emerging technology was managed in that era to inflict technical surprise, and derives lessons to help the U.S. Army hedge against technical surprise in future operations.

Category: Innovation

Winner: Acquiring the Unknown

Author: **Dr. Kurt T. Preston** is the deputy director of the Innovation Enablers Portfolio and the U.S. Army Corps of Engineers' Engineering Research and Development Center's liaison to the Office of the Deputy Assistant Secretary of the Army for Research and Technology.

Abstract: This essay notes that it has been 70 years since "The Endless Frontier" was published. It was a highly successful report that, at the end of World War II, established the central construct of basic and applied research within the federal research establishment. This essay suggests that while the linear thinking of "The Endless Frontier" was successful in the industrial era, we no longer live in a linear world and that the assembly line analogy it represents needs reconsideration.

Honorable Mention: Acquisition Courage: The Advent of the Army Smartphone AKA: How to Save a Billion Dollars and Change the Army

Author: **Mr. Jason Regnier** has been the deputy product manager for Nett Warrior in PEO Soldier since 2008.

Abstract: The author details the challenges, successes and outside-the-box approaches behind Nett Warrior, including the important roles played by GEN Peter W. Chiarelli, then vice chief of staff of the Army, and the late MG Harry Greene, then deputy of acquisition and systems management for the assistant secretary of the Army for acquisition, logistics and technology. According to the author, the project yielded this lesson for product managers: have the courage yourself to find the champions who are willing to do the right thing in acquisition. It could make a billion dollar difference.

Category: Lessons Learned

Winner: Lessons Learned—Update of the UH-60A/L Attitude Heading Reference Set (AHRS)

Author: **Mr. Mark J. Jeude** is chief of the Technical Management Division for the Improved Turbine Engine-Future Vertical Lift Project Office in PEO Aviation.

Abstract: Field failures of the Attitude Heading Reference Set (AHRS) on fielded UH-60A/L Black Hawk helicopters had the potential to impact the safe operation of more than 1,000 aircraft. This led the Utility Helicopters Project Office to form a "tiger team" to quickly mitigate this risk without negatively impacting the ability of the aircraft to perform its mission. This paper looks at the successes of this tiger team, and identifies lessons learned that may be applied in similar situations.

Honorable Mention: Four Ways to Improve Contract Support Within the Operational Contract Support Framework: A way Forward for Operational Contract Support

Author: **MAJ Eric Makepeace**, U.S. Army Reserve, is an Army Reserve contracting officer (51C) currently deployed in the Horn of Africa. In 2013 he deployed to Jordan as the operational contracting support officer and helped set the theater for current operations and contingencies, using the concepts he wrote about in this white paper. He trained with the 45th Contracting Squadron/LGCAA at Patrick Air Force Base, FL.

Abstract: The goal for operational contract support should be to better serve current (phase 0) operations, support annual training exercises, and prepare the theater for contingencies (wartime or natural disaster). Specifically, DOD expeditionary contracting strategy should address repeating requirements, support long-range planning, upgrade infrastructure during exercises, and use "reach-back" contracting resources.

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

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

MG Charles A. Cartwright (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

Ms. Mary Miller, deputy assistant secretary of the Army for research and technology

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

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

Mr. Kris Osborn, Managing Editor, Scout Warrior

Jeffery A. Steevens, Ph.D., senior scientist, U.S. Army Corps of Engineers' Engineer Research and Development Center, Environmental Laboratory

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

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

LTG Joseph L. Yakovac (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

Embracing Requirements Creep and Making Defense Acquisition Agile to Address a Changing World

By Mr. Joe Novick
Joint Program Executive Office for Chemical and Biological Defense
with contributions from ***Jorge Hernandez***

Requirements creep should be embraced, not dismissed. Said differently, the ability of acquisition programs to adapt to new threats and environments should be embraced, not dismissed! The variety of adversaries, complex foreign policy, and the speed of technology expansion present an ever-growing number of new threats in a fiscally restrained environment. Yet defense acquisition remains rigid, only able to change course at prescribed junctions. While efforts to rapidly field responses to emerging threats exist, these strategies oftentimes make critical trade-offs that increase management oversight and lifecycle costs in the longer term. How can defense acquisition become more agile to address the changing threat environment? Can the defense acquisition community embrace requirements creep while employing Better Buying Power to streamline acquisition?

In order to embrace requirements creep to make weapon systems align better to the changing threat, fundamental changes to the requirements generation process and to the defense acquisition process are necessary. The streamlining of the requirements and acquisition processes follow a waterfall (i.e., sequential/linear) approach that lacks the reflexive mechanism to address emerging requirements. While the capability documents are statutory for programmatic milestones, the requirements and acquisition processes are on separate but parallel paths, which can create frustrating bureaucratic delays when requirements are not met. By making acquisition programs more agile, program managers can deliver effective products at reduced costs and schedule.

Impacting Programs of Record

The first step to interweaving the requirements process into the acquisition process is to eliminate threshold requirements for non-Key Performance Parameters (KPPs) in the Capabilities Development Document in order to accelerate tradeoffs. KPPs would remain unchanged in having objective and threshold values as they are the distinguishing requirements that systems must achieve to be effective. By eliminating thresholds for non-KPPs, program managers will have the flexibility to test to objective requirements, evaluate the results, and negotiate trade-offs with the Combat Developers and requirements communities on a more regular basis. It gives program managers the flexibility to adapt the design rapidly to changing battlefields and threats. Therefore, met/not met decisions for non-KPPs would no longer exist. Instead, trade-offs are made between the program office and the requirements community based on tested performance against objective requirements. Trade-offs of non-KPPs can be made at the lowest practical levels without the need to bog-down a program by wasting time and money going through the requirements relief process at the upper echelons of the DOD.

The next step is adjusting the program management office to quickly make changes to the system's design and development, based on those trades or new requirements resulting from the changing threat environment. To do so, the program office would need to employ a "Requirements Manager" whose job is to translate and derive User requirements from the Combat Developer to the design team, and also, to translate technology limitations from the design team back to the Combat Developer. The Requirements Manager would have the difficult job of balancing duties as both the advocate and ombudsman for the User and for the design team. Coordination between the Combat Developer and the Requirements Manager would be regular and consistent, to the point where they will be on the same team.

The requirements traceability matrix (RTM), managed by the Requirements Manager, focuses on trade space against the objective requirements laid out in the requirements document. Management of the RTM must be meticulous. The RTM will track trades made with specific rationales and values from test results. Additionally, a mechanism must exist that formally commits the User to trade-offs made and noted in the RTM. The Requirements Manager must also have a keen understanding of the program schedule, costs, and funding to evaluate the impacts of trades made with the Combat Developer and the design team. The Requirements Manager steers the system design and development by juggling user needs against system capabilities and costs through the RTM.

The impact to contracting will result in reduced costs. Since the program office develops the specification based on objective and not threshold requirements, it can make use of performance incentives in cost type contracts for design and development. By incentivizing performance, the program office can motivate the contractors to meet objectives while evaluating trade space based on system performance observed during testing. Most importantly, the contractor will not be as constrained by design-limiting non-KPP requirements and can pursue more innovative designs. The contractor will make internal design trade-offs throughout development based on which incentives will maximize their fee. Through the Requirements Manager and the Contracting Officer Representative, the User priorities can be negotiated with the developer while minimizing changes to the statement of work or performance specification. The end state would be a lower probability of system rework, as requirements are not evaluated on a met/not met basis for non-KPPs, but rather by trading off low priority requirements directly with the User. The cycle of design rework against lower priority requirements can be eliminated, reducing hours (i.e., costs) on cost type contracts. Performance incentives promote higher quality designs and less rework while checking the contractor against poor performance.

Testing will require an increased investment up front that will save costs down the road. Testing to objective levels is inherently more expensive than testing to thresholds; however, by understanding system performance without met/not met criteria, formerly determined 'unmet' or 'met with exceptions' requirements will not require any additional testing if trades are made with the user and the design team. Therefore, the probability of retesting the system is reduced, which ultimately leads to cost savings. Also, retests can be designed based on more realistic metrics that would reduce test cost against objective metrics. The overall impact to test costs would depend on the performance of the contractor, quantity and scale of trades, and amount of retest.

Hurdles in Changing the Acquisition Process and Culture

Once we make the trades and develop and deliver new capabilities, how does the DOD go about meeting traded objective requirements? To address this issue, the DOD would increase the investment in Research, Development, Test, and Evaluation (RDT&E) beyond full rate production. Continuing to invest in RDT&E through Operational System Development provides a mechanism for technologies that were not fully matured during the Science and Technology or Engineering and Manufacturing Development phases to further mature. Program managers have a reliable mechanism to include emerging technologies in a future variant of the weapon system without slowing down the initial acquisition, and a mechanism to embrace requirements creep without establishing new acquisition programs. Program offices can use the Operational System Development funds to focus on new User priorities while fielding new capabilities. THIS IS AGILITY: adapting existing systems to survive and win in changing threat environments. I challenge acquisition leaders to recognize the benefits of and increase the investment in Operational System Development funding to evolve our weapon systems.

I hear buzzwords and catch phases about how the acquisition community needs to "be more agile" or "think outside the box" without mechanisms of doing so. Emergent requirements often break programs regardless of their advancements in science and technology or engineering due to the rigidity and inflexibility of the current acquisition process. Despite their ability to tailor the acquisition process to specific program needs, program managers are held to requirements and processes as if they are set in stone even when those requirements are low priorities or made obsolete by changing threats and battlefields. Yet, program managers are unable to change course due to bureaucratic pressures and timelines. Program managers meet resistance when "doing outside the box" and "being agile." DOD leadership must empower program managers to be flexible, make good trades, and make value decisions because they know what is best for their system and, with close communication with the User, know how the Warfighter will use it in the field.

We in the acquisition community set the bar high and develop capabilities beyond what we thought was possible. My recommendation does not change that and it aligns with the core tenants of Better Buying Power 3.0 (particularly: Improve Tradecraft in Acquisition of Services, Incentivize Innovation in Industry and Government, Incentivize Productivity in Industry and Government, and Eliminate Unproductive Processes and Bureaucracy). The DOD will continue to push technology beyond what was once thought impossible while improving the efficiency of delivering state-of-the-art equipment to our brave men and women on current and future battlefields.

***Joe Novick** began working for the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD) in 2005. Since 2007, he has continued his acquisition support for the JPEO-CBD with the Navy at the Naval Surface Warfare Center Dahlgren Division in Dahlgren, Virginia. He currently holds the position of Deputy Product Manager for the Joint Expeditionary Collective Protection program within the Joint Project Manager for Protection. Mr. Novick holds a B.S. in Biochemistry from the University of Virginia.*

HONORABLE MENTION

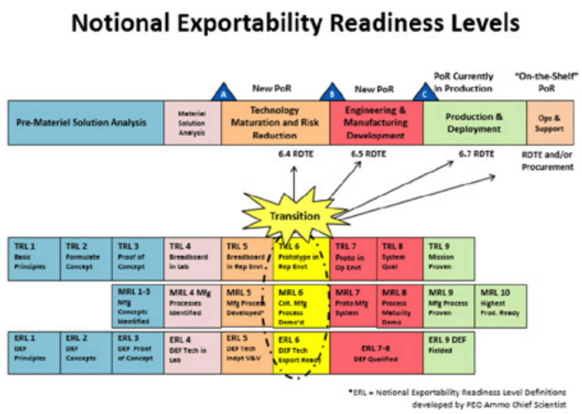
Is Your System Export Ready?

By Paul Manz
Program Executive Office Ammunition

As part of Better Buying Power (BBP) and its overarching set of acquisition related imperatives, there has been and continues to be an increased focus on including Defense Exportability Features (DEF) as an inherent part of all DOD systems envisioned for eventual export via Foreign Military Sales (FMS) and/or Direct Commercial Sales (DCS). Although not an entirely new concept, the formal recognition of DEF under the auspices of BBP can be found in Section 243 of Public Law 111-383, National Defense Authorization Act for Fiscal Year 2011 (FY11 NDAA) which directed the Secretary of Defense to "carry out a pilot program to develop and incorporate technology protection features in a designated system during the research and development phase of such system." Since that time numerous DEF pilot projects have been sponsored by the International Cooperation arm of the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics (OUSD(AT&L)/IC)) including the ongoing Common Joint Height of Burst Fuzing DEF pilot effort managed by Joint Center Picatinny in New Jersey on behalf of the entire Joint Munitions Lethality community.

Increasing our ability to export defense products has numerous benefits including greater economies of scale that reduce costs for all customers (including US customers), greater commonality and interoperability with our global partners, and strengthened relationships with our friends and allies. From a National Technology and Industry Base (NTIB) management perspective, these benefits also include strengthening and protecting our own industrial base through expanded DEF-enabled opportunities to meet minimum sustaining rates and maintain profitability in an era where defense spending is decreasing and many smaller tier companies are exiting the marketplace. Thus, DOD program managers and contractor teams have lots of reasons to work together to build in potential exportability "up front and early" in the system development life cycle. In fact, the USD(AT&L), as part of his BBP 2.0 guidance, identified the need for Milestone Decision Authorities to consider Defense Exportability at early acquisition milestone reviews including Materiel Development Decisions (MDDs), Milestone A, and pre-Engineering and Manufacturing Development (pre-EMD) reviews.

The above set of imperatives begs the need for a common communications framework and set of DEF-related terminologies and definitions to facilitate mutual efficient understanding amongst all stakeholders and parties. To this end, I have proposed, defined, and currently use a notional term and concept called Exportability Readiness Level (ERL) that is akin to Technology Readiness Level (TRL) and Manufacturing Readiness Level (MRL). ERLs ranging from 1 to 9 are used to quantify the maturity of DEF (i.e. Exportability Readiness) associated with critical technologies being incorporated into systems under development. In my mind, there is definitely a synergy between ERL and the usual TRL and MRL maturity levels desired by a program manager before they choose to integrate



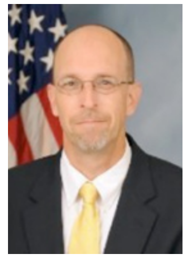
a new technology into a Program of Record (PoR). The above figure is my visual attempt to capture these synergies overlaid on a generic system development life-cycle template.

Based on the positive feedback I've received to date from a variety of government stakeholders across the acquisition, export, and policy communities as well as members from the NTIB, I think this notional ERL framework resonates with how we collectively conduct our acquisition business. So the next time you talk to your respective leaders and staff from Defense Export Control, Security Assistance, International Cooperation, or Higher Headquarters regarding DEF-related acquisition matters, you can use Exportability Readiness and ERLs to more easily communicate the risks associated with protecting resident Critical Program Information in your system prior to its eventual exporting via FMS or DCS. So, is your system export ready?

__Paul Manz__ currently serves as Chief Scientist for PEO Ammunition located at Joint Center Picatinny in NJ. Paul 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 from science and technology through production and deployment.

HONORABLE MENTION

Experience-Based Qualification Standards for the Contracting Workforce



By Thomas H. Miller
U.S. Army TACOM Life Cycle Management Command

Winston Churchill said: *"Gentlemen, we have run out of money; now we have to think."* This logic applies to the current Department of Defense (DOD) fiscal environment: shrinking budgets due to sequestration, but increasing operational requirements due to expanding global threats. DOD needs experienced, business and technology savvy personnel capable of managing its complex, multi-billion dollar programs successfully in order to provided needed capability to the demanding warfighters. It is imperative that the DOD/Army Contracting workforce evolve to meet this demand, as they are the point people negotiating and administering the contracts under which most of DOD's work is accomplished. LTG Michael E. Williamson, Director, Army Acquisition Career Management, explained his objective for dealing with this challenge in the overall Army acquisition workforce, which applies to the Contracting career field as well: "My plan is…to have the right people in the right jobs with the right skills at the right time to deliver decisive-edge capabilities to our Soldiers at all times…"

The Contracting workforce—made up of a mix of highly experienced but overworked senior level personnel and a recent influx of younger, less experienced personnel—is not well positioned to deal with the demands of the current environment, much less the increasingly demanding future. The Defense Human Capital Initiative March 2015 report on the DOD Contracting workforce states that senior career personnel (within 10 years of retirement eligibility) make up 47% of the overall workforce, while early career personnel constitute 29% and mid-career 24%. Former USD AT&L Jacques Gansler emphasized the risk related to this situation: "…one of the biggest problems we have right now—the experience of the acquisition workforce…unfortunately, we have had an aging workforce, and they were replaced by 'interns' … 55 percent of the DOD's acquisition workforce has less than five years of experience, with few mentors remaining to help them." What steps are required to better prepare the Contracting workforce? The current regimen of Defense Acquisition Workforce Improvement Act (DAWIA) certification training is necessary, but not sufficient.

The answer is a new system that ensures that Contracting personnel are qualified through on-the-job experience for the requirements of their jobs by laying out a career path of progressively more demanding experiential assignments designed both to prepare them for their current jobs and to help them plan their future career progression. This approach is consistent with the Better Buying Power (BBP) 3.0 initiative to "Establish Stronger Professional Qualification Requirements for all Acquisition Specialties." As the BBP 3.0 Sept 2014 White Paper states: "The DAWIA training and certification process must be supplemented to establish a stronger basis for levels of professional qualification…" How do we implement such a "Qualification Standards" system for the Contracting workforce? There are three (3) key steps that need to be taken:

1. The Undersecretary of Defense Acquisition Technology & Logistics (USD AT&L) and the Service Acquisition Executives (SAEs) should agree upon and issue an overarching qualification standards policy. An example of this is the Key Leadership Position qualification standards policy that was issued in 2014. By issuing a clear policy emphasizing the importance of qualified personnel at all levels, USD AT&L will establish the basis for new qualification standards that will identify experiential requirements for Contracting jobs, as well as for a qualification standards system that will objectively evaluate and validate when an employee meets those requirements. The policy should identify specific strategic objectives and minimal requirements for the qualification standards system, but allow enough flexibility for the services to develop and implement a system that best meets their needs.

2. USD AT&L should concurrently work with the SAEs and their Defense Acquisition Career Managers (DACMs) to detail the minimum experience required for the various positions—from entry to senior level—that constitute the Contracting career field. For example, an entry level Contract Specialist may require experience in pre- and post-award surveys, simplified acquisition procedures, administrative modifications, and developing a business clearance for a purchase order; while a senior Procuring Contracting Officer (PCO) for a Major Defense Acquisition Program (MDAP) may require experience in conducting a best value source selection for a major weapon system. It's important to have common minimum standards, in order to allow for portability of qualification records for those personnel wishing to pursue jobs in other service organizations. These standards should be published in a Contracting qualification standards "guidebook" that can be used both for validation of individual qualifications and to assist personnel in planning their experiential learning (generally documented in an Individual Development Plan (IDP)) in order to pursue their preferred career objectives.

3. The SAEs and DACMs should then define the process for how their service will assess and validate the common qualification standards, in order to comply with the USD AT&L overarching policy. As a minimum, the process should include: (a) Identification of officials that will independently validate qualifications based on information submitted by individual employees (I recommend that supervisors also review and concur in the information prior to submission by the employee); (b) A formal and informal mentoring system that will allow employees to work with senior level personnel to identify and pursue appropriate experiential learning opportunities; (c) On-line tools that will allow employees to develop IDPs documenting their experiential learning goals, utilizing a searchable qualifications standards guidebook, and allow for automated staffing and documentation of qualification requests; and (d) Identification of metrics and regular reporting in order to track progress within the Contracting workforce. USD AT&L, the SAEs, and the DACMs should share best practices and lessons learned in order to improve the overall DOD process over time.

Establishing a qualification system such as described above will enhance the overall effectiveness of the Contracting workforce by increasing the rigor of the DAWIA qualification experience requirements. As stated by Navy Acquisition Executive Sean J. Stackley: "…the more experienced and qualified the Acquisition Workforce (AWF), the better the decisions. The best acquisition outcomes are produced by the most experienced acquisition people—in technical knowledge and business acumen … " There will be challenges in implementing such a system, particularly in our current resource constrained environment. For example, providing access to some required experiences—such as participating in a Defense Acquisition Board (DAB)—may be difficult for some commands/organizations; so the services will need to provide ways to support these requirements, such as providing funding for temporary details to other organizations. These challenges must be addressed creatively and overcome, as the importance of a qualification system that addresses the current inexperience of a large part of the Contracting workforce can't be denied. As stated by Michael Fischetti, Executive Director of the National Contract Management Association: "…people are only as effective as the experience and training they have received …" Now is the time to provide the DOD/Army Contracting workforce with the experience they need to be successful in our increasingly complex business environment, so that that they can provide the weapons and services the Warfighters require to be successful against the current and future threats they must face.

Thomas H. Miller *is the Program Manager for the USMC Mine Resistant Ambush Protected (MRAP). He has 32 years of Defense acquisition experience, including serving as a Procuring Contracting Officer at the U.S. Army TACOM Life Cycle Management Command, Warren, MI.*

Category: Future Operations

WINNER

The Sensor Computing Environment Initiative: Achieving Comprehensive Sensor Interoperability for the United States Army

Mr. Clair Guthrie

Dr. Christina Bates

PEO Intelligence, Electronic Warfare, and Sensors

The Challenge: Disparate Systems Performing Disparate Functions

As the United States Army reflects upon more than a decade's worth of conflict, it faces new and myriad challenges. The development, acquisition, fielding, and sustainment of capabilities necessary to successfully engage in asymmetrical warfare have both stressed and strengthened the Army's ability to do so in a rapid, effective, and efficient manner. Furthermore, the emergence of the "quick reaction capabilities" (QRC) paradigm enabled the Army to act quickly to satisfy urgent capability requirements. These successes, however, ushered in new and different challenges for the Army.

Today, the Army faces significant budget cuts and is expected to win in a complex world. Coupled with the looming fiscal constraints are the challenges resulting from more than a decade's worth of rapid system procurements, including system capability overlaps and untapped functionality. One prominent challenge that emerged from the procurement and independent fielding of numerous Command and Control (C2) products was a "stovepipe" result—myriad sensors were deployed to meet emerging requirements, yet the majority of these sensors are not capable of interoperating with other sensors and, in turn, sharing vital information for increased situational awareness.

ASA(ALT) Launches the Sensor Computing Environment Initiative

In response to these challenges, and to better position the Army to fight and win in a complex world, the Assistant Secretary for the Army for Acquisition, Logistics, and Technology (ASA(ALT)) launched the Sensor Computing Environment (Sensor CE) Initiative in late 2009. Sensor CE is part of a larger effort, led by ASA(ALT), referred to as the Common Operating Environment (COE). The COE is an approved set of computing technologies and standards that will enable the rapid development and execution of secure and interoperable applications across a variety of computing environments (CEs).

Sensor CE is one of six computing environment initiatives under the aegis of the COE. Its overarching goal is to establish standards, formats, and an integration approach for the Army that enable sensors and systems to interact and share relevant information with minimal up-front investment. Effective sensor integration will ultimately enable sensors (and, in turn, their data) to be dynamically discovered and accessed by a Soldier, platform, and/or commander, regardless of "ownership" of a given sensor. This dynamic and rapid discovery and sharing of critical sensor data will improve and inform decision-making and enable decisive action, thereby making significant and positive contributions to the Army's ability to fight and win.

ASA(ALT) directed the Project Manager Terrestrial Sensors (PM TS) (a subordinate command of the Program Executive Office Intelligence, Electronic Warfare, and Sensors — PEO IEW&S) to lead the Sensor CE effort. PM TS also partners with the Communications-Electronics Research, Development, and Engineering Command's (CERDEC) Night Vision and Electronic Sensors Directorate (NVESD) to develop capabilities that enable the Army to achieve the integration standards resulting from the Sensor CE Initiative.

Traditional Approaches: Moving from Disparate Sensors to Integrated Sensors

The "quick reaction capability" (QRC) paradigm ushered in a new, truncated process for acquiring and deploying systems to support the high operational tempo required for the Army to execute missions successfully in both Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF). While the QRC approach enabled rapid deployment of urgently needed capabilities, it resulted in significant and lingering challenges. For example, to support urgent Intelligence, Reconnaissance, and Surveillance (ISR) and Force Protection (FP) requirements, the Army fielded numerous and varied ground and air sensors. While these sensors proved essential for providing commanders with a comprehensive understanding of the battlefield, they were, in large part, disparate systems conducting disparate functions. As such, the information they gathered, while valuable, could not be shared with other sensor systems. Moreover, the absence of a unified, standardized sensor architecture resulted in the procurement and fielding of sensors with inherent limitations. For example, many sensors fielded were not capable of interacting with other sensors due to a number of factors, including proprietary, hardware, and software limitations.

To achieve a degree of connectivity among the various sensors fielded, the Army pursued "sensor integration." An integrated sensor is one that communicates and shares data with a given ground station primarily because they speak a common language. This is referred to as a "static integration." A static integration is useful, yet limited in its application. For example, for this sensor to communicate with a different component (e.g., another sensor or ground station), a second integration must be established—a second language must be learned.

While sensor integration improved situational awareness, it proved to be an interim, partial solution. And, as the operational tempo required to successfully fight multiple wars on multiple fronts continued to increase, the need for sensors that could readily, rapidly, and consistently share data became paramount. It was time for the Army to move toward comprehensive sensor interoperability.

From Sensor Integration to Sensor Interoperability

The key distinction between sensor integration and sensor interoperability is the degree of commonality in language. Just as human beings must speak a common language to effectively communicate, so too must sensors (and their related components). For sensors to readily and rapidly share information, they must all be capable of learning and using a common language. With sensor integration, only some sensors speak a common language; sensor interoperability requires that all sensors speak the same common language.

The question then became, "how do we determine the common language?" The Sensor CE Initiative's primary objective is to answer this question in the form of an overall Sensor Architecture. The Architecture will comprise the standards and formats—the language "rules"—that a given sensor (whether currently fielded or under development) must "learn" and use. The standards and formats will inform all sensor aspects, including sensor design (hardware and software), operation, and proprietary considerations.

Beyond establishing what will become the Army's common language for all sensors, the Sensor CE Initiative also includes the following key sensor services that will enable the Army to unlock the full potential of comprehensive sensor interoperability.

Sensor Discovery. In order for sensors to communicate and share data across a grouping of Mission Command Systems, sensor users must be able to dynamically determine the existence, availability, and capabilities of Army sensor assets. The full implementation of sensor discovery will enable Army sensor users to advertise, discover, subscribe to, be notified of changes to, and disseminate sensor, geospatial, and other operational data, files, and services across computing environments based on a common interoperability data standard.

Sensor Full Motion Video (FMV) Dissemination. While the discovery, accessibility, and distribution of sensor data among numerous sensors is an important and preliminary step for the Sensor CE Initiative, significant focus is also directed at the quality of the data distributed. As such, Sensor CE is establishing the capability to disseminate full motion video (FMV) across Army formations ranging from the Enterprise Cloud, to Division Command Posts, and to dismounted Soldiers. PM TS brings specialized knowledge and experience to this aspect of the effort; the PM was responsible for the initial implementation of FMV in Afghanistan to enable high quality video distribution across the restricted bandwidth architectures and network complexities characteristic of smaller and remote posts.

Sensor Alerts. Technology continues to advance our ability to communicate with vast audiences rapidly, and with relative ease. Similarly, a significant benefit of the Sensor CE Initiative will be the ability of numerous sensors to leverage the data shared among them to generate and disseminate "sensor alerts." This capability provides sensor users with the ability to combine local information and intelligence, and position location information with user and network determined sensor information to improve awareness, define contextual significance, and inform understanding, decisions, and action. An example of a sensor alert is a request from Mission Command Systems for Unattended Ground Sensor (UGS) detection alerts along given roads concerning potential improvised explosive device (IED) emplacement. As such, when an UGS detects seismic activity, it sends an alert to a Mission Command System regarding the specific detection. This information may then be leveraged by the recipient(s) to make better and more informed decisions regarding a given mission.

Sensor Management. Currently, the Army is limited in its ability to provide sensor management consistently across Command Post and Mounted and Dismounted Mission Command Systems. Sensor management will enable any sensor operator (whether a primary or secondary user) to receive slew-to-cue messages and to steer the sensor to the precise latitude, longitude, and elevation requested by a Mission Command System.

Applying Sensor CE Concepts: The Integrated Sensor Architecture

NVESD's Integrated Sensor Architecture (ISA) represents the real-world application of the tenets of the Sensor CE. The ISA is a middleware solution that enables dynamic discovery of sensors in a given network by a sensor user, regardless of a given sensor's modality or ownership. The ISA is not concerned with the type of sensor system seeking access to the network. It only requires that the sensor system seeking access describe itself in terms of its capabilities and the kinds of data it will provide to the network. To enable interoperability, the ISA requires that the system use the ISA's common language while on the network. These limited requirements are the driving factor in the ISA's ability to be dynamic and to adapt to the various constraints inherent in a small FOB environment. Moreover, all data on the ISA is encrypted and a structured registration process is employed that requires sensor authentication and publication prior to gaining access to the network.

The ISA has been successfully applied at various demonstrations and NVESD is working with several Army program managers to incorporate existing sensors into the ISA, thereby further enabling the sharing of critical sensor data for increased situational awareness and, in turn, improved decision-making.

The Future of Sensor CE

Currently, the Sensor CE Team is in the process of preparing for, and implementing the various sensor services discussed in this article. Part of this preparation entails frequent testing and demonstrations using live sensor systems. These tests and demonstrations enable the Team to further refine the Sensor CE standards and formats, while simultaneously assessing the implementation of the various Sensor CE services. Moreover, the Team continuously assesses the interface between the Sensor CE endeavor and the other Computing Environment Initiatives within the larger COE effort to ensure alignment is achieved, where required.

As our Nation faces existing and emerging threats, and our Army readies itself to win in a complex world, improved situational awareness and a mastery of the battle space will become increasingly important. Sensor CE's pursuit of comprehensive sensor interoperability, and its myriad and significant benefits, will be integral to the Army's ability to access, apply, and unlock the full potential of sensor data to take decisive action and ensure combat overmatch.

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HONORABLE MENTION

Disruptive Technology: Managing its Potential Impact on Future Army Operations

By CPT(P) Hassan M. Kamara

Program Executive Office Missiles and Space

"As we look ahead, many potential adversaries will have greater access to sophisticated and disruptive technologies that could greatly complicate our operations. We cannot afford to let technological change level our advantage in any potential conflict." [1]

–The Honorable Heidi Shyu

Introduction

This paper studies the potential influence of disruptive technology on future Army operations and the Soldier from a historical perspective. It provides insight into how Army and Acquisition Corps leaders can hedge against technical surprise in future operations. The adversaries of the United States will continue to seek innovative ways to disrupt its technological dominance in land warfare. Shawn Brimley and his co-authors concur that "during the next decade, the rise of new powers and the accelerating diffusion of advanced technology throughout the international system will pose significant challenges to U.S. technological dominance in military affairs."[2] This raises the question: how can the U.S. Army manage emerging technology to prevent technical surprise and complications to future operations? Using the U.S. interwar period (1918-1941) as its case study the paper examines how emerging technology was managed in that era to inflict technical surprise, and derives lessons to help the U.S. Army hedge against technical surprise in future operations.

This U.S. interwar period is an excellent case for studying disruptive technology to gain lessons for the present because it is similar to the contemporary period in terms of military resource constraints and the rapid evolution of technology. John Peters and his co-authors agree with this comparison, and write that "the adversaries and the missions that the Army must be prepared for are more ambiguous and diverse than at any time since the period between the World Wars. Additionally, the pace of technological advance… presents a number of challenges, including preventing technical surprise."[3] Peter Singer also concurs, and wrote that "just as submarines, tanks, and airplanes disrupted tactics, doctrine and organizational identity in the early 20th century, so today we are struggling with deep changes wrought by the likes of drones, cyber and lasers."[4]

What is Disruptive Technology?

For clarity the paper defines disruptive technology as the type which U.S. rivals can manage to gain tactical, operational and even strategic capabilities—previously only accessible and afforded by the better funded U.S. military—to shift the paradigm of American arms superiority. This definition is consistent with Clayton Christensen's definition of disruptive innovation as one that "allows a whole new population of consumers at the bottom of a market access to a product or service that was historically only accessible to consumers with a lot of money or a lot of skill."[5]

Management is central to a technology becoming disruptive. Carey Wagen concurs in writing that disruptive technology "is defined not by the nature of the innovation itself, but by the way in which dominant organizations mismanage technology that eventually becomes a mortal threat."[6] In other words, in land operations advanced armies sometimes tend to reject or under-invest in certain technologies because it fails to meet their mission and priorities, meanwhile their less resourced rivals seeking to offset their superiority in arms exploit such technologies and change the paradigm of land operations.

Disruptive Technology in the Interwar Period

Disruptive technology can be managed to shift existing paradigms and complicate Army operations. This happened during the interwar period when emerging tank technology was managed by the German Army in a way that complicated U.S. Army and Allied operations in World War II (WWII). Following WWI, the German Army (Reichswehr), integrated emerging tank technology with emerging aircraft, artillery and communications technology into doctrinal and organizational reforms. This was done amidst the economically crippling war reparation payments and military sequestration mandates of the 1919 Versailles Treaty. According to James Corum, in Germany "the new technology that came out of the First World War was given a primary place in the new operational doctrine; the relatively large-scale armor operations, that is, tank attacks in regimental strength, were foreseen as being an important part of the new maneuver war."[7] Germany circumvented Versailles Treaty restrictions on Research, Development, Test and Evaluation and established the equivalent of Program Executive Offices in foreign countries to develop emerging tank technology among others. Corum wrote that through a special acquisition's directorate in the General Staff (Special Group R or Sondergruppe R) the German Army funded and managed tank and aircraft programs in Russia—operating development and test centers like the one in Kazan.[8] These efforts produced some of the highly effective battlefield systems Germany used to complicate allied operations in WWII like the Panzer MkIV tank.

In contrast, during the interwar period the U.S. Army struggled to manage emerging tank technology into something disruptive of the WWI defensive, light infantry centric operational paradigm. According to Millett and his co-authors, "Congress and the General Staff agreed that tanks should support infantry, the decisive arm in combat, so tank units joined the regular infantry for training. The doctrine for tank use remained wedded to the concepts (and speed) of infantry combat."[9] Perhaps fixated on the clumsiness of the nascent tanks, Army leaders had difficulty visualizing the technology's disruptive potential like their German counterparts, so they opted for gradual developments grounded in the light infantry centric existing (WWI) operational paradigm.

It is worth noting that some Officers challenged the management of tank technology in the U.S. Army during the interwar era. As a Field Grade Officer in the mid-1920s, Dwight Eisenhower disagreed with the Army's management of tank technology. Eisenhower saw greater potential for the tank, and believed that "by making good use of the terrain in advance, tanks could break into the enemy's defensive positions, cause confusion…[and] make possible not only advance by infantry but envelopments."[10] Consequently, Eisenhower and his colleague George S. Patton Jr. experimented with the tank and published their findings in the Infantry and Cavalry journals.[11] Both future generals were reprimanded by the Commander of the Infantry School, Major General Charles S. Farnsworth—Eisenhower wrote that "I was told that my ideas were not only wrong but dangerous and that henceforth I was to keep them to myself. Particularly, I was not to publish anything incompatible with solid infantry doctrine. If I did, I would be hauled before a court-martial. George, I think, was given the same message."[12]

Figure 1: German Panzer Mk IV[16]

The difference in the management of emerging tank technology during the interwar period would adversely impact the American Soldier in the Army's first tank battle with its German counterpart in North Africa. John Muller wrote that in the 1942 Battle of Happy Valley, the U.S. Army fielded the 1941 M3 Stuart medium tank, while the German Army fielded the heavy 1939 Panzer Mk IV tanks, which had a larger 75mm main gun and rolled cast iron frontal armor.[13]

U.S. Army First Lieutenant Freeland A. Daubin Jr of the 1st Regiment, 1st Armored Division, wrote that he and "his loader picked out one particular Mk.IV tank … then pumped more than eighteen rounds [from the Stuart's 37mm "squirrel rifles"] at the Jerry [German] tank…which ricocheted harmlessly off its armor." Daubin added that "the effect of the Mk. IV's long 75mm gun on the Stuart" blew him out of his tank turret and killed his crew.[14] The resource constrained German Army's management of tank technology during the interwar period clearly complicated U.S. Army operations in North Africa during WWII.

According to Muller, the Army adapted—"American armored divisions…featured far too many light tanks. The use of light tanks was reevaluated, taking the Tunisian experience into account. By the time of the Normandy invasion, light tanks had been drastically reduced in number and reassigned to the role of reconnaissance."[15]

Insights from the Past

How the German and U.S. Army managed emerging tank technology in the interwar era to impact the paradigm of land warfare yields some insights for today's Army leaders and the Acquisition Corps (AAC). This historic experience yields lessons for current efforts at managing the risk of disruptive technology to future army operations.

The German Army saw great potential for emerging tank technology and so developed a doctrine to promote and harness both near and long term tank development. This resulted in superior tanks, and combined arms forces that shifted the paradigm of WWI army operations. According to Mike Sherry, the U.S. Army's Armored Force commander, Maj. Gen. Adna R. Chaffee, noted to Congress in April 1941 [that] "The success of the German armored tactics has

Figure 2: M3 Stuart Tank - U.S. Army[17]

as we know been great and has rendered obsolete the tactical procedures of WWI."[18]

Army and Acquisition Corps leaders should continue to emulate this dual near and long term approach to managing the potential of emerging technology. In 2012 Ms Shyu "advocated an integrated approach to modernization aimed at harnessing near-term emerging capability able to quickly benefit the force while also emphasizing Basic Research able to identify potentially paradigm-changing technologies for the future."[19] This approach will help guard against operational complications from adversarial use of disruptive technology by harnessing such technology into the hands of the U.S. Soldier.

The German Army proved more willing than the U.S. Army to boldly adjust its frame of reference for land warfare based on emerging military technology in the interwar period. Leonard Wong and Stephen Gerras define frames of reference as "the complex knowledge structures we develop through personal and professional experiences that influence—and often limit—the way we approach issues."[20] This is vital to managing emerging technology. According to James Corum, the Reichswehr Chief of Staff Hans Von Seekct believed WWI proved maneuver was superior to firepower, and he visualized emerging technology turning future war into a largely mechanized, high-speed maneuver affair.[21] This resulted in doctrinal change that fostered disruptive development of tank technology.

The cognitive ability of today's Army and Acquisition leaders to adjust existing frames of reference vis a vis the potential of emerging drone, cyber and other technology is key to making the latter disruptive, and maintaining the Army's operational dominance. For the Army and its Acquisition Corps to act on obsolescence of cherished programs of record and identify and boldly mature potential paradigm-shifting technologies, leaders at all levels have to continue to cultivate the ability to change prevailing (orthodox) frames of reference.

Conclusion

As a consequence of globalization and rapid technological evolution, the current and future adversaries of the United States will continue to gain access and afford technologies that could disrupt existing paradigms and potentially complicate U.S. Army operations like they did in WWII. However, with dynamic management of emerging technologies the U.S. Army can hedge against complications to future operations by its adversaries, and preserve its technological advantage.

Endnotes

1 *Heidi Shyu as quoted in "Shyu outlines strategic modernization planning approach," Kris Osborn, U.S. Army, accessed 1 August, 2015, http://www.army.mil/article/89846/*

2 *Shawn Brimley, Ben FitzGerald and Kelley Sayler, "Game Changers: Disruptive Technology and U.S. Defense Strategy," Center for a New American Security, September 2013, http://www.cnas.org/files/documents/publications/CNAS_Gamechangers_BrimleyFitzGeraldSayler_0.pdf, 7*

3 *John Peters et. al, "A Methodology For Developing Army Acquisition Strategies For An Uncertain Future," RAND, last modified March 18, 2014, http://www.rand.org/content/dam/rand/pubs/monographs/2007/RAND_MG532.sum.pdf. 2.*

4 *Peter W. Singer, "Lessons on Defense Strategy from the Interwar Years," Armed Forces Journal, (August 2013), http://www.brookings.edu/research/articles/2013/08/strategic-defense-reform-singer.*

5 *Clayton Christensen, "Disruptive Innovation," accessed August 2, 2015, http://www.claytonchristensen.com/key-concepts/#sthash.el6GkTaz.dpuf.*

6 *Carey M. Wagen, "Twenty-First Century Defense and Disruptive Innovation," U.S. Army War College, March 22, 2012, http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA563406, 3.*

7 *James S. Corum, "A Comprehensive Approach to Change: Reform in the German Army in the Interwar Period," in The Challenge of Change: Military Institutions and New Realities, 1918-1941, edited by Harold R. Winton and David R. Mets (Lincoln: University of Nebraska Press, 2000)42.*

8 *James S. Corum, The Roots of Blitzkrieg: Hans Von Seeckt and the German Military Reform (University Press of Kansas, 1992), 98.*

9 *Allan R. Millett, Peter Maslowski and William B. Feis, For the Common Defense: A Military History of the United States of America (New York : Free Press, 2012), 358-359.*

10 *Dwight D. Eisenhower, At Ease: Stories I tell to Friends, (New York: Doubleday & Company Inc, 1967), 169.*

11 Eisenhower, At Ease, 171-172. Dwight D. Eisenhower, At Ease: Stories I tell to Friends, (New York: Doubleday & Company Inc, 1967), 172.

12 John M. Muller, "Ronsons, Zippos, Brew-Ups, and Tommycookers: The M4 Sherman Tank and American Armored Development during World War II," University of Texas at Arlington - Open Access Theses, Last modified 07 August, 2013, https://uta-ir.tdl.org/uta-ir/handle/10106/11090, 48.

13 Freeland A. Daubin Jr.,"The Battle of Happy Valley," quoted in Ronsons, Zippos, Brew-Ups, and Tommycookers: The M4 Sherman Tank and American Armored Development during World War II, John M. Muller, University of Texas at Arlington - Open Access Theses, Last modified 07 August, 2013, https://uta-ir.tdl.org/uta-ir/handle/10106/11090, 49.

14 John M. Muller, "Ronsons, Zippos, Brew-Ups, and Tommycookers: The M4 Sherman Tank and American Armored Development during World War II," University of Texas at Arlington - Open Access Theses, Last modified 07 August, 2013, https://uta-ir.tdl.org/uta-ir/handle/10106/11090, 50.

15 Armed Forces History Museum, "Top Ten Tanks of WWII," 18 April, 2012, http://armedforcesmuseum.com/top-ten-tanks-of-wwii/.

16 U.S. Veterans Memorial Museum, "M3 Stuart," accessed 14 August, 2015 http://www.memorialmuseum.org/displays/tanks/item/m3-stuart.

17 Mark D. Sherry, "Armored Force Organization," in A History of Innovation: U.S. Army Adaptation in War and Peace, edited by Jon T. Hoffman, Center of Military History, Washington, D.C., 2009, http://www.history.army.mil/html/books/innovation/History_of_Innovation.pdf. 51

18 Heidi Shyu as quoted in "Shyu outlines strategic modernization planning approach," Kris Osborn, U.S. Army, accessed 1 August, 2015, http://www.army.mil/article/89846/.

19 Stephen J. Gerras, Leonard Wong, "Changing Minds in the Army: Why it is so difficult and What to do about it," Strategic Studies Institute - U.S. Army War College, October 28, 2013, http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=1179, 6.

20 James S. Corum, The Roots of Blitzkrieg: Hans Von Seeckt and the German Military Reform (University Press of Kansas, 1992)38.

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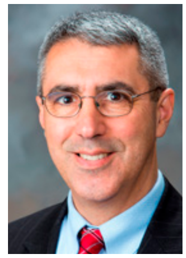
Category: Innovation

WINNER



Acquiring the Unknown

By Dr. Kurt T. Preston
Office of the Deputy Assistant Secretary of the Army for Research & Technology

Abstract: This essay notes that it has been seventy years since The Endless Frontier was published, a highly successful report that at the end of World War II established the central construct of basic and applied research within the federal research establishment. This essay suggests that while the linear thinking of The Endless Frontier was successful in the industrial era, we no longer live in a linear world and that assembly line analogy it represents needs reconsideration.

"If you want something new, you have to stop doing something old."

–Peter F. Drucker

2015 marks seventy years since Vannevar Bush in his report, the "Endless Frontier," set out the construct of basic followed by applied research as the fundamental process for scientific innovation. As brilliant as the ideas were and remain to some extent, the purpose of his report was to convince an audience of a by-gone era to the merit of funding scientific research. His audience were the people of the industrial age where the assembly line was the dominant symbol of technology and efficiency. As such his theme of intellectual linearity resonated with their experience. Having just emerged victorious from World War II in large part due to the innovations rolling off American assembly lines, his audience was familiar with the scene of automobiles, tanks, and airplanes, advancing along sequential steps serviced by largely unrelated teams toward a finished product. One team would build the chassis, another install the drive train, another the engine, another the seats and interior, etc., etc., down the line until a car, tank, or other innovation popped out off the assembly line.

Bush's successful premise was that ideas advance in a similar assembly line manner. In his argument, innovation begins with the raw material of basic research, is processed into applied research, and is further refined by testing and evaluation. One wonders, given his genius, whether he understood this description of linearity to be suspect, but clearly his argument was compelling and useful. It provided those unfamiliar with science with an analogy sufficiently familiar to encourage support of scientific research.

The analogy remains powerful to this day. It remains the central tenant of scientific innovation entry into the acquisition process and, as such, ensures that ideas developed within the defense laboratory structure wind their way down an assembly line of knowledge, passing from one worker or team to another until they arrive "fully demonstrated, evaluated, and tested" and ready to enter the acquisition process.

The problem with analogies, especially powerful analogies, is that they trap the mind and thereby limit the examination of alternatives. We no longer live in the elegant world of the sequential intellectual processes and innovation. Disruptive innovation may especially be temporally non-linear. Nonetheless, the maturation structure of our scientific and technological development remains highly linear. The principal products of basic research are the experimental results reported to the scientific literature. The department's laboratories then execute the requirements driven research that represents the next step on the assembly line. Finally, innovation may roll through the development centers to another person or groups of individuals and on to possible entry into the acquisition process.

Given that it has been 70 years, perhaps it is time to entertain alternative analogies and non-linear methods for the development of innovation within the science and technology enterprise. One alternative is the idea of the champion innovator. Today research program managers generally stay within the domain of their particular research area for their entire career. In contrast, a champion innovation path would be a career path whereby bench engineers and basic research scientists would transition not only their ideas, but their person along with the innovation to the next development level and potentially all the way through the acquisition process. In this way, they would share their technical insight with others and pick up skills and knowledge along the way. Similar to an overseas assignment, perhaps an individual who champions an innovation might be given something similar to overseas return rights should their innovation fail along the way and they find themselves in foreign quarter of the acquisition enterprise and a long way from where they started. In the academic setting, particularly active faculty members commonly perform basic research, applied research, and create commercial or pursue commercial application through testing and evaluation simultaneously. In their case, the academic setting and the 9-month academic contract provides the opportunity for a soft-landing and restart if their idea fails to mature.

Other constructs which bear consideration include fast failure, this approach would allow for increased opportunities to pursue so called, "wacky" ideas by providing seed funding and time for high risk innovation. In a sense the Army provides limited opportunities of this nature to university basic researchers through short term, innovating research (STIR) grants for less than 3-months and $50,000. Innovative fast failure has conceptually been around for a while, and is currently somewhat of a buzz word. It may also sound similar to in-house, laboratory independent research efforts. Nonetheless, current seed funding activities should be analyzed and reviewed with an eye toward optimization for high risk innovation.

Finally, one might examine the nature of the "Pasteur's Quadrant" which argues that "researchers are motivated simultaneously by expanding understanding and increasing our abilities (technological, including medicine) to improve the world." One suspects that DOD researchers are already so motivated, but the implications of this construct in the organization of the research enterprise requires further examination. Returning to the idea of transitioning the person, as well as the idea, the "Pasteur's Quadrant" idea might organizationally be represented by a vertical career path that once or twice in their career conveys the bench scientist or engineer through the acquisition process or a portion thereof.

The bottom line is that it has been seventy years since the Endless Frontier was published. Perhaps the old model is the best model. On the other hand, perhaps it is time to think hard about new models for science and technology. As Drucker said, "If you want something new, you have to stop doing something old."

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HONORABLE MENTION

Acquisition Courage: The Advent of the Army Smartphone

(AKA: How to save a billion dollars and change the Army)

By Jason Regnier
Program Executive Office Soldier

I remember the day it happened—a sweltering day in 2011—even worse inside the Pentagon. The Vice Chief of Staff of the Army was at a systems acquisition review for Ground Soldier Ensemble and you could tell by his body language and clenched fists that he had something to say. We had completed page 1 of the 47 page briefing describing the, size, weight, power, cost and schedule status when he said:

"Stop. This is what I want."

GEN Chiarelli held up his smartphone. He had flipped ahead of the briefer to see the current stats: 11 lbs of electronics, 12 watts burning, and all for only $45,000. This got a dismounted leader networked situational awareness and mission command (SA/MC) system on dark rainy nights. Priceless, but too heavy. He looked at what a year of intense DOD-level competition had produced as a replacement for the canceled Land Warrior and did not like what he saw. He knew that despite being a canceled program, it was one of the busiest programs in the Army because the leaders wanted the capability. The Product Manager at the time, LTC Brian Cummings, had demonstrated the power of dismounted Situational Awareness/Mission Command and kept the program in production and deployment a full year after cancellation to support deployed Warfighters.

We Cannot Do That, Can We?

"Why is the system so heavy? Is this the best the military can do? Look at what commercial industry has done with smartphones. What is stopping us?"

The program office and the TRADOC Capability Manager for Soldier knew why: it was the age-old DOD/Army requirements and specifications for a ruggedized military computer systems capable of working in all environments. These key attributes ultimately drove the size, weight, power and cost (SWAP-C), which made us nervous because we knew he knew that. Plus, we were still only on page one of the briefing. We could tell it would be a long day.

Undaunted, GEN Chiarelli asked us to be specific as to what were the main requirements that drove the SWAP-C. We told him the environmental and electromagnetic factors drove most of it. Specifically, the system had standard systems' requirements for it to work from -20C to +55C, to go underwater for 2 meters for 30 minutes, survive a nuclear blast EMP, and….

"Stop right there," he said. "Does the Soldier go underwater two meters for 30 minutes?"

"Well, no sir," we replied. "That would be silly; he would be dead. Frankly, I'm not sure the dismounted Soldiers would do so well against a nuclear blast either."

"Then why do we require it?" he asked.

"Because we always have," was the only answer we could offer. We laughed to ourselves and thought that his heart is in the right place, but he cannot possibly change what Department of Defense requirements have mandated for four decades. Besides, these are JROC-approved requirements for Ground Soldier Ensemble. The Army does not get to change JROC requirements. But, GEN Chiarelli had a curveball to throw:

"You tell me what I need to change, and I'll change it."

Over the Plate it Comes, What Now?

The briefing ended on page 1. It took great courage for a four-star general to make such a bold statement, but he had three things going for him. First, he was a believer in the system. Second, the Army had created the "Configuration Steering board" and he was looking to use it. Third, he was right. As the meeting ended in what we thought was either an opportunity or disaster, GEN Chiarelli had one final comment: "Good work. I look forward to your recommendations for requirements changes in one month." One other recommendation from Army leadership was to change the name, as recent news reporters said, "it conjures an image of a men's singing group."

After the meeting, my chief engineer pointed out that the real issues in the requirements are related to the myriad DOD environmental test standards and regulations. I said "That's the problem." He said, "No, that's not the problem. If they were statute, that would be the problem. Statues cannot be waived. Regulations can be waived by the right person." GEN Chiarelli was the right person and he had the ball in a four seam grip.

The idea that dismounted Soldiers need ruggedized computers for tactical use was a commonly held belief. Requirements for tactical computers tended to focus on robust exteriors, EMP hardening, and waterproofing, with less emphasis on ergonomics, user interface, or ease-of-use. With the introduction of smartphones, a radical new world of microcomputing could keep up with Moore's Law at no cost to the Army, and be capable of supporting Soldiers in the tactical fight. Was that tradeoff for cost, weight and environmental factors worth it? Another key fact: while the Army had put $30 million into three competing contracts for a next generation Land Warrior, Google, Samsung, Motorola, and Apple had produced dual-core smart devices for $500. It was literally cheaper to have almost 100 spares for each Nett Warrior than to have one single unit built by the defense industry. How could the Army compete with that?

The Configuration Steering Board: What's in a Name?

The Army convened a Configuration Steering Board a few months later, in which we detailed what could be traded in order to get to smartphones as the basic unit. One thing that could not be traded was the need for secret certification. That presented a challenge because no phones were made in the US and almost all the code for Android and other systems was written in places like India, Vietnam, and China. In the newspapers were stories of hackers getting into Paris Hilton's personal phone and no one seemed safe. However, if the VCSA could find a way to waive the requirements and call the environmental requirements' bluff, we would still have to find a way to make the system secret. GEN Chiarelli approved the CSB briefing which detailed the requirement changes, the associated risks, limitations and most importantly the advantages of smartphones as a Soldier-mounted computer. The key was that none of the cost-drivers were listed in the language of the Joint Staff Approved Key Performance Parameters. It turns out that the Army could change some system attributes through a CSB, especially those that drove cost, weight size or the environmental regulation. This was his curveball.

Several months later, on the Army's birthday, the Ground Soldier Ensemble's singing career ended as it was renamed after COL Robert Nett, a World War Two Medal of Honor winner.

How About A Billon Dollar Savings?

The moment GEN Chiarelli approved the actions from the briefing, he personally saved the Army and the American taxpayers $882 million over the lifecycle, and $440 million went back to Army coffers that day. It was a monumental risk, and took great courage on his part, but he believed in the concept. Going this commercial-off-the-shelf (COTS) route, as we have all been promised for years, was not without risk. Every Christmas, new phones came out and we realized it would take almost a year per specific phone to get it certified for secret information storage. Every year and a half, though, the phones (which are functionally microcomputers) were twice as good, with double the processors, memory, or speed at the same cost. Plus, Soldiers really do fight where it is wet, cold, hot, and miserable, which are places where you would not want to take a $500 smartphone.

The COTS smartphone offered saving in another key area: user interface. Google and the rest had put billions behind it, and based on the explosive growth, they know even better than the Army what they are doing for human factors integration. Their bottom line depended on it. To meet the secret capability requirement, the Nett Warrior system runs a sanitized, DOD-approved version of the Android OS, meaning Soldier acceptance and familiarity is high. This, in turn, means New Equipment Training teams can spend less time on the basics of smartphone operation and more time on the additional tactical capabilities of Nett Warrior. The user interface is immediately familiar to anyone comfortable operating a smartphone, with virtually all operations possible with pressing, holding, and pinching, just as with a commercial smartphone.

Is there an App for That?

In addition to ease of use, the Nett Warrior program has released a readily available Software Development Kit (SDK), meaning a number of applications can be developed. The program office had promised the Army that Nett Warrior would truly have open systems interfaces, with no proprietary restrictions, and that we would make it available at no cost to the rest of the Army. A dozen other microcomputer-based Army systems are now taking advantage of this Mobile/Hand-Held Computing Environment. This, in turn, means the system can also be upgraded and expanded without a major overhaul of the software architecture. Several examples include a ballistic calculator for snipers, Machine Foreign Language Translation, and a Tactical Video Viewer which will stream video from some Soldier-carried unmanned aircraft systems to the team leader, allowing a powerful battlefield awareness at the team level.

Who is Going to Hit the Home Run?

One last critical round of courage was required was on the part of the Army Staff; specifically, navigation of the approval authorities. The Nett Warrior system had not yet passed the Key Performance Parameters due to reliance on developing external systems. The program was at a key production milestone that needed a positive legal assessment by the AAE's staff, agreement across DA staff, and the MDA's personal confidence and final approval. Despite lacking enough data to pass, and the immaturity in related systems, one key person was able to show the program office how to manage navigation through the byzantine bureaucratic requirements, challenging obstacles, and staffing process of the Pentagon. There were tense days as we wound down to the Low Rate Initial Production decision, with acrimonious debate, and, fortunately, a critical guiding coach.

Through sheer smarts, experience, and force of will, the critical player who came on the field and put his personal attention into getting Nett Warrior into the next phase was none other than MG Harry Greene, the ASA(AL&T) DASM at the time. He believed in the concept, and he believed he could convince the Pentagon lawyers, and he had the courage to bring it though.

The Army owes a debt to both GEN Chiarelli and MG Greene that equals about a billion dollars overall, but for us, just the satisfaction of a job well done will be reward enough.

To my fellow product managers I offer this lesson: have the courage yourself to find the champions who are willing to do the right thing in Acquisition. It could make a billion dollar difference.

Mr. Jason Regnier *has been the Deputy Product Manager for Nett Warrior since 2008, originally under then-LTC Brian Cummings, and again when BG Cummings returned as PEO Soldier. Mr. Regnier has been with the program from Milestone A through the successful Milestone C in 2012, which initiated the Low Rate Initial Production and three subsequent production decisions. Over 7,000 of the systems have been equipped and are in combat rotations around the world. The AAE recently approved a 2015 decision for almost 10,000 more through 2018 so he should have plenty to keep him busy except for an occasional Nats game.*

Category: Lessons Learned

WINNER

Lessons Learned—Update of the UH-60A/L Attitude Heading Reference Set (AHRS)

By Mark J. Jeude
Program Executive Office Aviation

Field failures of the Attitude Heading Reference Set (AHRS) on fielded UH-60A/L Black Hawk helicopters had the potential to impact the safe operation of over 1000 aircraft. This led the Utility Helicopters Project Office (UHPO) to form a Tiger Team to quickly mitigate this risk without negatively impacting the ability of the aircraft to perform its mission. This paper looks at the successes of this Tiger Team, and identifies Lessons Learned that may be applied in similar situations.

Helicopters such as the Black Hawk rely on gyros to provide heading and attitude references which are used by the pilot/co-pilot to safely operate the helicopter. The UH-60A/L Black Hawk originally used mechanical gyros to perform these functions. Obsolescence concerns led the UHPO and the Communications-Electronics Command (CECOM) to develop Fiber Optic Gyros (FOGs) as a replacement for the original mechanical gyros. The new gyros were implemented into the UH-60A/L as part of a dual Attitude Heading Reference Set (AHRS) installation, which were installed into 1042 Black Hawks by field units using a Maintenance Work Order (MWO).

In 2013 the UHPO started seeing an increase in the number of reports from the field identifying failures of both AHRS which affected the attitude indications on the pilot/co-pilot Horizontal Situation Indicator (HSI) and Vertical Situation Indicator (VSI). Loss of this critical information during Instrument Meteorological Condition (IMC) operations would create a hazard which could result in the loss of the aircraft. To ensure that a dual failure would not occur during IMC operations, the UHPO and the Aviation & Missile Life Cycle Management Command (AMCOM) issued a Safety of Flight message in May 2013 directing that all dual-AHRS equipped Black Hawks be converted into a more reliable "split" configuration (consisting of a single AHRS, a mechanical Roll Rate Gyro, and a mechanical Vertical Gyro). This initial phase (i.e., Phase I) of the AHRS risk mitigation effort was completed in February 2014, when the last UH-60A/L Black Hawks were reported to be in the approved, "split" configuration. The AHRS Tiger Team was formed in June 2013, and was tasked with identifying the path forward that would allow a quick return to the more reliable, dual AHRS installation; and with identifying a path forward to address all AHRS-related performance, reliability, and obsolescence issues to support the UH-60A/L for the rest of its life cycle. Team members included the Technical, Logistics, and Fleet Management staff from the UHPO; Northrup Grumman Italia (NGI), the manufacturer of the AHRS; the Aviation Engineering Directorate (AED); and CECOM's Logistics and Readiness Center. The Tiger Team quickly identified the effort needing to be accomplished to allow the Black Hawk to continue performing its mission—develop a Backup Attitude Indicator (BAI) to provide improved system reliability, and conduct investigations to identify the AHRS failure modes and to develop appropriate fixes to address those failure modes (designated as Phase II); and determine the requirements the AHRS needed to meet to ensure it continued to perform safely while also addressing reliability, obsolescence, and other life cycle concerns (Phase III).

Working with the Aviation & Missile Research, Development & Engineering Center (AMRDEC) Prototype Integration Facility (PIF), the UHPO was able to quickly identify commercial BAIs that could meet the Black Hawk's critical operational requirements; successfully integrate the BAI into the UH-60A/L; and perform testing to substantiate that the performance was satisfactory. Because of the uncertainty over the supportability of the commercial BAIs, the UHPO also worked to qualify an Emergency Standby Instrument System (ESIS) which would not only be fully provisioned, but would also be useable in the UH/HH-60M. This dual effort not only provided a BAI quickly, to address the immediate need, but also addressed the requirement that any equipment added to the UH-60A/L was fully qualified, reliable, and supportable throughout its life cycle. The BAI is currently operating on the UH-60L fleet of a Foreign Military Sales (FMS) customer; the ESIS is scheduled to be qualified in November 2015.

Through extensive box-level evaluations and through flight testing, the Tiger Team was able to identify the failure modes that would need to be addressed to allow a dual AHRS configured aircraft to fly in IMC conditions. Testing was conducted by NGI at their facility; by the Communications-Electronics Research, Development, and Engineering Center (CERDEC); and by the UHPO through the Aviation Flight Test Directorate (AFTD) at Redstone Arsenal, AL. The testing and analysis led to the identification of the changes (in February 2014) that would need to be made to the AHRS. NGI incorporated the required changes into the AHRS, and provided test assets to CECOM which allowed final box- and aircraft-level testing to begin at AFTD in March 2015. The thoroughness and accuracy of the investigation and redesign efforts were evident in that there were no critical failures or issues uncovered during the test program. Additional risk reduction testing started in June 2015, both at AFTD and by CERDEC, to obtain additional confidence in the updated AHRS, and to identify any potential field support issues prior to fielding of the new system. This testing is expected to be completed by November 2015, at which time the UHPO will be able to initiate fielding of the improved AHRS.

Phase III of the AHRS Tiger Team effort began in August 2015, with agreement between UHPO, AED, and CECOM on the requirements for the long-term solution. Because of the benefits realized from the performance of the Tiger Team on Phase II of the effort, the UHPO agreed to continue with the same team arrangement for the execution of Phase III. The ultimate successful execution of this Phase will ensure that the UH-60A/L Black Hawk will have an AHRS system that performs properly, allows for safe operation of the Black Hawk in IMC conditions; and meets the reliability and supportability levels that are required to allow the Black Hawk to continue meeting its mission requirements.

An assessment of the challenges and successes of the UHPO AHRS Tiger Team allows identification of three factors which, if given proper attention during the execution of efforts to address the safety of Army vehicles, will help ensure that the results of the efforts meet the expectations of the responsible office, as well as those of the warfighter.

The first lesson learned is to correctly identify short-term and long-term goals. The UHPO Tiger Team separated the short-term goal to quickly mitigate the risk to the Soldier, from the long-term goal of providing a qualified, supportable system to address the life-cycle needs of the system. The requirements for Phase I were reduced to those that directly supported the need to immediately address the risk of the AHRS. Any additional requirements were placed on the later Phases of the effort. Because of the minimal number of Phase I requirements, the Tiger Team was able to quickly identify and implement a path forward that was executable. The field would have been exposed to the increase in risk for much longer had the Tiger Team attempted to first develop a "final" solution.

The second lesson learned is that the success of the AHRS Tiger team relied heavily on the ability to maintain consistent goals and objectives. Having clear and concise goals at the beginning of a project is helpful, but allowing stakeholders and customers to constantly change those goals throughout the effort will tend to keep the team from being successful. While it is to be expected that numerous opportunities will arise during the execution of an effort to revise the original goals and objectives, no changes should be made unless it can be shown that the change would clearly result in a benefit to achieving those goals and objectives. During the execution of the AHRS effort, the UHPO leadership engaged with stakeholders and customers on several occasions to remind them of the true goals and objectives of the effort, and to explain how their desired change would or would not improve the ability of the Tiger Team to achieve them. In almost all cases the originator of the requested change agreed that the change was not needed. Managing requirement "creep" in this way allowed the Tiger Team to operate efficiently by following the original plan of action, and not getting forced to make numerous revisions to the plan simply to satisfy desires that were not in keeping with the true needs of the Army.

Finally, a lesson about Obsolescence. When we transitioned from mechanical gyros to FOGs we consolidated the functions of five separate gyros into two units. While this approach was an improvement from a cost and reliability standpoint; it significantly increased the probability of total loss of attitude indications in the cockpit due to the consolidation in functions. No one did the analysis required to discover this issue until we started seeing dual failures in the field. This was because the program was run as an obsolescence update, which would normally be limited to form, fit and function replacement of components with no changes to core system architecture. The lesson learned is that system architectural changes must be fully analyzed and their impacts understood regardless of how they come about. Phase III of the AHRS effort is performing the detailed critical analysis of the system architecture to ensure that future changes to the AHRS addresses not only obsolescence but also ensures that the probability of loss of functionality is minimized to within acceptable limits.

In summary, the successes the AHRS Tiger team has had (and will continue to have) were made possible through the development of clear initial guidance; the discipline to manage changes to that original guidance; and from the empowerment and support provided to the Tiger Team by the leadership of the Project Office. The AHRS Tiger Team successes are a testament to the ability of a properly configured and managed team, even one with as diverse a membership as this team had, to achieve success in mitigating risks to which the warfighter is exposed, and by developing improved material that performs properly yet still is affordable from a weapon life-cycle perspective.

Mr. Mark J. Jeude *has worked in Army Aviation for over 28 years. Mr. Jeude started in 1987 with the Aviation Systems Command in the Aviation Engineering Directorate, holding various positions including Chief, Propulsion Systems Branch, and Chief, Apache Systems Division. In 2007 Mr. Jeude was selected as the Chief, Technical Management Division, Utility Helicopters Project Office, PEO Aviation, and in that role oversaw the technical effort associated with fielding of the UH/HH-60M Black Hawk, and initiation of the Improved Turbine Engine Program (ITEP) and the UH-60V (UH-60L Improved Cockpit) Program. In 2015 Mr. Jeude was selected to be the Chief, Technical Management Division, for the new Improved Turbine Engine-Future Vertical Lift Project Office.*

HONORABLE MENTION

4 Ways to Improve Contract Support within the Operational Contract Support Framework

A way forward for Operational Contract Support

By MAJ Eric Makepeace, U.S. Army Reserve

The goal for Operational Contract Support should be to better serve current (phase 0) operations, support annual training exercises, and prepare the theater for contingencies (wartime or natural disaster). Specifically DOD expeditionary contracting strategy should address repeating requirements, support long-range planning, upgrade infrastructure during exercises, and utilize "reach-back" contracting resources.

Overview

The U.S. military relies heavily on local contracting at overseas locations, just as it does for U.S. bases and it should apply the same successful contracting strategies in order to implement the Operational Contracting Joint Concept (Joint Chiefs of Staff, 2013). The Department of Defense (DOD) needs to improve its expeditionary contracting strategy and manage the portfolio of contracts with a holistic view to improve quality, reduce administration and the potential for errors, and reap the benefits of economies of scale and best practices. Operational Contract Support (OCS) has three functional areas: support integration, contracting support, and contractor management (JP 4-10 Operational Contract Support, 2014). The goal for OCS should be to better serve current (phase 0) operations, support annual training exercises, and prepare the theater for contingencies (wartime or natural disaster). Specifically, DOD expeditionary contracting strategy should address repeating requirements, supporting long-range planning, upgrading infrastructure during exercises, and utilizing "reach-back" contracting resources.

1. Manage Repeating Requirements with Flexible Contracts

All bases large or small require similar services and supplies. These repeating requirements can be grouped and managed within roughly twenty (20) categories of commonly-used services and supplies, with one contract per region flexible enough to handle surges:

1. Life Support (Billeting, Meals, Laundry, Showers, Toilets, Hazmat, HVAC, Vector Control, etc.)
2. Power Generation (often separate from life support)
3. Water, Bottled
4. Water, Bulk (Supply & Delivery, Storage)
5. Fuel (Supply & Delivery, Storage, Fuel Coupons)
6. Barriers (Concrete T-walls, HESCO containers)
7. Cell Phones
8. NTVs (Rental Cars)
9. Trucking (Line Haul) and Bussing
10. Material Handling Equipment (MHE) and Heavy Equipment (bull dozers, etc.)
11. Force Protection (lights, Cameras, Dogs, Scanning equipment)
12. Shipping (DHL, FedEx)
13. Class IV Building Supplies (Wood, Electrical parts, gravel)
14. IT / Automation
15. Field Service Reps (Vehicle / Equipment Maintenance)
16. Gym Equipment
17. Furniture
18. Medical Equipment and Supplies
19. Other

Flexible contract types include Blanket Purchase Agreements (BPAs), Indefinite Contracts (IDIQ, IDID), and Basic Ordering Agreements (BOAs) (FAR Part 16). A flexible contract has a single parent contract managed by one Service/DOD entity's contracting office. The beauty is that from this single contract, hundreds of orders for this item/service can be placed without the administrative burden of establishing a new contract.

In the parent contract there is a catalog or menu of items pre-negotiated for price, terms, and conditions. Orders can be placed for any item in the catalog for any service. Each order can come from any government service that transfer funds to the contracting officer. One rental car flexible contract can be established for an entire country and managed by the Lead Service for Contracting[1]. Then all other services can place orders against that rental car contract for their needs (FAR Part 17.5 Interagency Acquisitions and Economy Act). The Army can establish an IDIQ contract and issue the first two (2) orders for Army vehicles, the 3rd order for Air Force vehicles, the 4th for Special Operations. Each order can have different catalog items, different dates, and different contacts. Additional items can be added to the catalog at any time through a contract modification to the base contract, so the Navy can have its favorite generator and the Air Force can have its favorite.

Reducing the number of overlapping contracts by multiple Services means less overall setup time (Procurement Acquisition Lead Time or PALT) which can take from several months to over a year to put a new service contract in place because of government contracting checks and balances.

Smaller services like the Marines and Special Operations just don't have the timeline or bandwidth to write new contracts, so often they are under-supported or end up overpaying with government credit cards.

Global contracts already exist for several of these Contracting Categories and deploying units can order from these the same as if a local unit was the administrator. TRANSCOM has port stevedore contracts

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[1]Lead Service for Contracting (LSC) and Lead Service for Contracting Coordination (LSCC) are two organizational constructs outlined in JP 4-10 Operational Contract Support.

with MHE and line haul trucking. DLA-Energy has a fuel contracts that include the ability to order and place portable storage tanks within the area. The Army Corps of Engineers (USACE) has a global generator contract.

Flexible contracts also reduce the need to use Acquisition and Cross Servicing Agreements (ACSA) with the host nation military. ACSA has become a blight on acquisitions and is often frowned upon by the US State Department for its association with corruption and overpaying. ACSA is also a sore spot for the host-nation military who feel the US Military is overtaxing them for last minute logistical support.

By focusing on one common product or service, DOD can promote quality and install a feedback loop and bring best practices forward to every location and communicate lessons-learned back to contracting everywhere. Categories can be run like a program (and even a command) where one cell or Center of Excellence manages all Life Support Contracts everywhere (or Rental Cars or Heavy Equipment etc.), and contracting personnel in the field become liaisons to a more proficient support team back in CONUS.

With the U.S. specifying high quality products and services in their solicitations and contracts from lessons learned, local contractors will adapt quickly or lose work. Local companies want to "westernize" their processes and add high-quality projects to their portfolio, so they can take part in more high-profile and higher-revenue contracts.

2. Support Long-Range Planning

Expeditionary contract management should be treated like a program with hundreds of contracting projects to achieve the goal of setting the theater for contingencies. CONUS Air Force bases already have long range "Straddle Programs" that forecast the bases infrastructure needs 3 years, 7 years, 20 years into the future. They use a monthly planning meeting between Civil Engineering, Contracting, and Operations to manage the list of hundreds of future projects. Projects must meet design, approval and funding milestones in order to receive Fiscal Year funding and the list is re-prioritized at every meeting. Contingency locations should utilize engineering assets like USACE forward teams (FEST-A) and J4 Engineers to come up with long-range infrastructure goals. Then, this regionally-focused engineering team should break those massive "rebuild the airport" projects into manageable projects that meet current operational and training exercise needs; thus passing the bona-fide rule that contracting[2] can only support existing requirements. Projects should be designed to come in lower than Military Construction (MILCON) spending threshold to eliminate the need to for congressional approval and USACE oversight (5-years minimum lead time). It would be difficult to justify rebuilding another country's airport, but a plausible smaller project would be to build a new ramp and hangar and that better supports current flight operations and the annual special operations training exercise conducted jointly with the host nation.

A monthly meeting between USACE Engineers, J4 Engineers, Operational Contract Support (OCS), Operations, and J8 Budgeting should be established to prioritize infrastructure projects and place them on the Fiscal Year Spend-Plan during Phase 0 operations. The first months of a new Patriot Battery deployment are expected to be austere, but after months and years, this emplacement should have the benefits of strategic planning to become more livable as well as more effective with drainage, gravel, overlapping protection barriers, HVAC, non-potable water well, better dinning facility, solar powered security lights, guard towers, RAID towers, MHE, on-site Field Service Reps, etc.

3. Exercise Contract Support During Exercises

Exercises should also include exercising contract support planning and surging of existing contracts. Units should train the ability to "plug into" existing flexible contracts for logistical support. Trained units should write an Annex W Operational Contract Support to their operations order and submit for redlines to the Lead Service for Contracting and the Operational Contract Support Integration Center (OCSIC) (JP

[2]The Bona Fide Needs Rule is one of the fundamental principles of federal appropriations law. Simply stated, a "fiscal year appropriation may be obligated only to meet a legitimate, or bona fide, need arising in, or in some cases arising prior to, but continuing to exist in, the fiscal year for which the appropriation was made." (The underlying statute is 31 U.S.C. § 1502(a)—HHS.gov)

4-10 Operational Contract Support, 2014).

4. Utilize Reachback Contracting Resources

Deployed contracting and OCS personnel should utilize "reach-back" resources from ACC, DCMA, DLA, the Reserve, and others. These organizations have established reach-back cells and capabilities to support the small number of deployed acquisition professionals. Army Contracting Command (ACC-Rock Island) supports Life Support contracts and close-outs (Jake Adrien and Andrea Kalb, 2014). The Defense Contracting Management Agency (DCMA) supported Iraq and Afghanistan wars with contract negotiations and administration. JCASO teams from DLA have assisted commands with temporary staff augmentation to implement OCS and stand up an Operational Contract Support Integration Center (OCSIC).

The Army Reserve has two contracting battalions and a detachment of DCMA personnel under the 977 Sustainment Command ready to deploy as Contingency Contract Teams. Most of these personnel are working as GS civilians in government contracting with qualifications and experience that surpass most active-duty contracting officers. Reserve Contracting Officers are capable, ready, and willing to assist the war-fighter and the overwhelmed, deployed expeditionary contracting officer.

Summary

Current expeditionary contracting is a mixed bag with some overseas bases excelling while others are under-supported and without surge capacity in their contracts and therefore without surge capacity in their logistical support and infrastructure. The goal for OCS should be to better serve current (phase 0) operations, support annual training exercises, and prepare the theater for contingencies (wartime or natural disaster).

References

FAR Part 17.5 Interagency Acquisitions and Economy Act. (n.d.). FAR Subpart 17.5-Interagency Acquisitions . Retrieved from https://www.acquisition.gov/sites/default/files/current/far/html/Subpart%2017_5.html

AACoE. (n.d.). Army Acquisition Center of Excellence (AACoE). Retrieved from http://asc.army.mil/web/organization/aacoe/

DLA-Energy. (n.d.). Bulk Petroleum Contract Awards . Retrieved from http://www.energy.dla.mil/bulk_petroleum/Pages/Contract_Awards.aspx

DPAP. (n.d.). Defense Procurement and Acquisition Policy. Retrieved from http://www.acq.osd.mil/dpap/

FAR Part 16. (n.d.). Types of Contracts. Retrieved from Federal Acquisition Regulation: http://farsite.hill.af.mil/

Jake Adrien and Andrea Kalb. (2014, 6 17). Finding Closure. Retrieved from Army Contracting Command -- Rock Island: http://www.army.mil/article/150681/Finding_Closure/

JCASO. (n.d.). Joint Contingency Acquisition Support Office (JCASO). Retrieved from http://www.dla.mil/JCASO/Pages/default.aspx

Joint Chiefs of Staff. (2013, October 7). Operational Contract Support Joint Concept. Retrieved from Program Support, Office of the Deputy Assistant Secretary of Defense: http://www.acq.osd.mil/log/PS/ocs/joint_concept/OCS_Joint_Concept_Exec_Summary_public_Oct2013.pdf

Joint Chiefs of Staff. (2014). Joint Publications 4-10 Operational Contract Support. Joint Chiefs of Staff.

JP 4-10 Operational Contract Support. (2014). Joint Chiefs of Staff. Sandbook. (2013). CCR 415-1. United States Corpse of Engineers (USACE).

USTRANSCOM. (n.d.). Contracts. Retrieved from http://www.transcom.mil/foia/contracts.cfm

William Cooley and Brian Ruhm. (2014). A Guide for DOD Program Managers. Defense Acquisition University (DAU).

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