HOW TO BE
an **Effective**
Military
Innovation
Champion

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HOW TO BE
an **Effective** Military Innovation Champion

Col George M. Dougherty, USAF

The U.S. military is working to enhance its methods for fostering technological innovations, particularly disruptive or "game-changing" innovations that can alter the character of military operations and provide sustained advantages over potential adversaries. However, no technological innovation is inherently disruptive. A military technology can only achieve disruptive impact after it achieves institutional support and is combined with complementary innovations in military doctrine, organization, training and other supporting areas. Many studies of military innovation have found that the difference between an innovation that achieves revolutionary impact and a promising invention that languishes in obscurity is often the engagement of an effective military champion.

A Unique Role

Effective military innovation requires many factors, including supportive processes, resources and leadership. Effective innovation champions are only one factor, but one that is timeless and within the power of many acquisition professionals to help provide.

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A military innovation champion is a leader, at any level, who takes it upon him- or herself to help build the institutional support for an innovation and catalyze the supporting activities needed to advance it from a concept to a fielded military capability. It's rarely an assigned role. There is little formal training. Many emerge from acquisition positions, where exposure to new technologies may be greatest. But champions also may step forward from positions leading operations, on Service or joint staffs, or other functions. They are self-selected, and their actions usually are "above and beyond" their formal duties. A formal role as a program manager, innovation officer or other official can help—but it doesn't make a champion. The essential qualifications of champions are possessing the vision to accurately see how an emerging technology could revolutionize military operations as well as the passion to ensure that the United States captures the potential advantages.

Typically, the military champion is a uniformed officer with technical training. In some cases, the role is performed by a Department of Defense (DoD) civilian. In either case, the champion is technically competent enough to understand the innovation and military missions, procedures and organizations well enough to orchestrate translating the innovation into practice.

Military champions include such famous names as Gen. Billy Mitchell, the "Father of the U.S. Air Force," and Adm. Hyman Rickover, the "Father of the Nuclear Navy." However, champions are needed at every level. Victor "Brute" Krulak was a 24-year-old lieutenant in the Marines in 1937 when he hit upon the idea of a landing craft with a square bow that serves as a retractable ramp. When his sketches and recommendations were ignored by the Navy, he built a scale model on his own and demonstrated it to the Marine general in charge of amphibious training. His idea was embraced by wooden boat builder Andrew Higgins who used his own funds to build prototypes of such a vessel. When World War II broke out, the Higgins Boat championed by Krulak was built in the thousands and became the iconic landing craft responsible for all the U.S. amphibious operations in the war. Whether you're a junior officer like Brute Krulak, a midgrade officer in acquisition or field operations, or a senior leader, your role often is as critical as the inventors' in determining whether a promising innovation achieves its potential impact. But how can one be an effective military champion for an innovation?

A Concise Framework

Above all, championing an innovation requires initiative and a sense of ownership. It's fundamentally about being a change agent. Within the military community, the champion's name may be the one most often associated with the innovation, whose personal investment of energy and reputation helps overcome the inevitable obstacles. As an effective champion, you may need courage and dedication. You need to be the hero of the story.

Happily, the activities required of a military champion are simple to summarize. Studies of military innovation have analyzed the contributions of past champions. Studies of business innovation provide further support. The role is analogous to that of a large corporation's internal innovation leader or "intrapreneur" who must create and champion a business model and go-to-market strategy to convert a new technology into a business.

The key activities of the military innovation champion are synthesized here into a new, simple and easy-to-remember framework, CAPE for "Connect, Advocate, Protect and Envision" (Table 1). A more detailed explanation follows:

Connect: A technological innovation effort often starts far removed from the military "customers" who ultimately will use it, the funding and contract authorities that can support it, the developers of the doctrine and other complementary

Table 1. The Proposed CAPE Framework

The Four Main Activities of a Military Innovation Champion		
C	Connect	Forge relationships between the technical developers, complementary functional leaders and potential military users.
A	Advocate	Publicize the innovation to military stakeholders and resource providers and educate them about its potential benefits.
P	Protect	Shield the project and team from hazards such as funding cuts, expanding requirements, or turnover of senior-level sponsors.
E	Envision	Create the vision for how the innovation will impact future military capabilities and how it should be implemented.

Source: The author

innovations needed to implement it, and the senior stakeholders whose support is needed to drive the required changes. This is especially true for the increasing numbers of technologies that arise outside of military programs, within the commercial or academic worlds. A champion is responsible for making those connections. He or she must identify stakeholders and complementary functions, solicit feedback from potential users and help bring together the pieces of a solution.

Advocate: This is the most visible activity of a champion. It includes educating others about the innovation, building networks of support, and turning others into advocates, including senior leaders and operational stakeholders. Advocacy goes beyond securing initial funding for development. It may include one-on-one meetings, speaking at technical or operational symposia or conferences, writing articles and news releases, and organizing influential events like operational demonstrations. Advocacy may need to continue, and evolve, over the life of the effort.

Protect: Acquisition project managers know that even "routine" projects often are buffeted by changes in budget, schedule and requirements. For potentially disruptive innovations, the waters can be even choppier. For instance, the temptation can be great for higher headquarters to take resources from innovative projects seen as "long term" or "risky" to cover the needs of more established programs or support current operations. The military champion must try to protect the effort from adverse programmatic decisions where appropriate, and help ensure the availability of needed resources.

Envision: The most creative and intellectually rewarding part of being a military champion includes developing the vision for how the innovation could be applied to military missions in the future. As earlier military champions drove thinking about how the airplane could impact warfare through control of the air, or envisioned how night vision equipment could enable U.S. military forces to "own the night" with round-the-clock operations, a present-day champion can help the military community understand the implications and applications of the new innovation. The champion's thought leadership should connect the technology to future concepts of operation (CONOPS) and a new path to mission success. This vision, and feedback from receptive stakeholders, can influence the direction of the technical effort in a virtuous cycle.

The four activities are mutually supporting. A compelling vision of military utility helps in advocating for the innovation, a strong network of connections and potential users helps the champion protect the innovation project, and so on. By devoting time and attention to these four activities, a

Col Joe Davis, USAF, a decorated Korean War attack pilot, demonstrated the role of an effective military innovation champion by envisioning and driving the development of the first laser-guided bombs.
Source: National Museum of the United States Air Force.

champion can maximize the chances of success for a worthy military innovation.

An Example in Action
Military champions are found throughout military innovation history. For instance, visionary junior and mid-grade military officers within the Army Signal Corps were critically important to the adoption of the Wright brothers' airplane and its further development into a military capability. An example a bit closer to home may illustrate the role and impact of a champion on a modern military innovation.

In 1965, Col Joe Davis, USAF, was the Vice Commander of the Armament Development and Test Center at Eglin Air Force Base in Florida. He witnessed a demonstration of one of the few laser illuminators in the world at that time, and heard a presentation from engineers at Texas Instruments (TI) regarding exploratory work on using laser illumination to guide a missile. Having flown F-84 attack jets in the Korean War, he envisioned using a laser spot to guide a gravity bomb to destroy a hard-to-hit point target, such as the bridges in Vietnam that were massively and repeatedly bombed in raids that incurred many aircraft losses. He pictured a laser guidance package that could be attached to bombs already in the inventory. After discussing the idea with the TI engineers, he used a rapid funding authority to provide $100,000 for development of prototype hardware. The TI engineers developed a radical

low-cost approach using a "shuttlecock"-shaped laser seeker nose and tail fins. Despite skepticism within the Air Force and TI leadership of the workability of such a concept, seemingly derived from a science fiction novel, Col Davis advocated for more funding from the Air Force's Aeronautical Systems Division at Wright-Patterson Air Force Base in Ohio. He often gave presentations together with the TI experts. In 1968, he used his flying experience to lead the live bombing tests of the prototype laser-guided bombs in Thailand and Vietnam. The end result was the Paveway series of precision guided munitions that provided revolutionary capability during the 1991 Gulf War. Col Davis' passionate and sustained effort as a champion was critical to taking this technology from the research lab to the battlefield.

Lessons for Application

Most innovations aren't once-in-a-generation breakthroughs with obvious potential to upend existing military warfighting techniques, but every potentially valuable innovation can benefit from the efforts of a military champion. The likelier that the innovation could be disruptive or "game changing," even within a specialized domain, the more critical the role of the champion. Four additional observations can help potential champions further enhance their effectiveness.

Tailor the Role to the Situation. Customize the role and activities to your circumstances. For a junior-level project manager at a laboratory or warfare center, building awareness of the innovation and developing connections between the project and more influential stakeholders and gatekeepers could have the greatest impacts. For a more senior leader, protecting the innovation from adverse budgetary and political forces and using his or her network to align support from leaders across the Services and DoD could be the most valuable contribution. Like Davis, the champion should leverage unique knowledge and experience.

The Champion Role Is Portable. It can take a significant time to build support and momentum for a disruptive innovation, and military assignments can be short. The champion role can continue after leaving the assignment. If the innovation is important to the military, it will continue to deserve your effort, and your new position may provide unique opportunities to help. For example, in the earliest days of carrier aviation before World War II, the first aviation admirals helped place their proteges in follow-on assignments elsewhere in the Navy where their advocacy could help institutionalize carrier aviation as a core warfighting capability.

Do the Homework. It's important to back up a vision and advocacy with facts. A champion must be armed with knowledge as well as passion and be ready to question his or her assumptions and evolve positions over time as new information becomes available. This will make that champion more credible and effective, and ensure that he continues to push in the right directions.

Political Skills Are Important. It's possible to overplay the champion role and end up hurting the cause. Mitchell, for instance, let his frustration with the slow adoption of aerial bombing boil over into public statements that led to his famous court-martial. Effectiveness sometimes requires patience, and the political savvy to win over opponents gradually. Thinking about each stakeholder's interests can help tailor the message to address their priorities and concerns.

Future Evolution

The military Services and the Office of the Secretary of Defense are designing and implementing enhanced innovation management processes and systems. As illustrated by the most consistently innovative private companies, well-designed innovation management processes help immensely in smoothing the road from idea to working prototype and then to fielded capability or marketed product. However, disruptive innovations may never occur solely via a standardized process. Vision and initiative, such as exhibited by Brute Krulak and Joe Davis, are likely to remain essential factors. With the future success of the DoD's innovation initiatives, the role of military innovation champion will become easier, but it will always be in demand.

Summary

The contributions of military innovation champions have been critical to disruptive military innovation through the decades, and may further increase in importance in the years ahead. Despite its importance, it's a role that is difficult to formally assign and isn't emphasized in acquisition training. Someone who has a technically informed vision and chooses to step forward could leverage the simple framework and guidance presented here to follow in the footsteps of many other champions and help bring a future possibility to light.

With luck, any reader of this article could be the hero of the next military innovation story.

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- The competition is open to anyone interested in the DoD acquisition system and is not limited to government or contractor personnel.
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- Papers must be submitted by Dec. 1, 2018, and awards will be announced by January 2019.

Where Do We Go From Here?

Guidance for the Product Support Manager

Elizabeth Lederer

D uring 2008 and 2009, a working group from the military Services, Office of the Secretary of Defense (OSD), industry, and academia performed an assessment of Department of Defense (DoD) product support, and identified eight major areas for improvement. The DoD Senior Steering Group endorsed the consortium's report, which subsequently was published in November 2009. One of the recommendations of the Product Support Assessment report was the development of a new Product Support Business Model (PSBM), which included the new Product Support Manager (PSM) role.

The PSBM was characterized as a game changer that would help to align and synchronize "operational, acquisition, and sustainment communities … to deliver required and affordable warfighter outcomes." The PSM was seen as "crucial to the delivery of not only system-level, but also portfolio- and enterprise-level capabilities across the spectrum of defense resources."

Elevating the PSM Role
At the time of the Product Support Assessment report, each of the military Services had personnel serving as lead logisticians, with various Service function titles: Assistant Program Manager for Logistics, Deputy Program Manager for Logistics, System Sustainment Manager, etc. These personnel typically came from the life-cycle logistics (LCL) career field but did not consistently demonstrate the needed leadership and technical competencies.

In order to build on the existing lead logistician role, the need to elevate the PSM was identified as part of the goal to improve the achievement of desired product support outcomes. Draft language to public law was introduced via Section 805 of Fiscal Year (FY) 2010 National Defense Authorization Act (NDAA) (Public Law 111-84) in October 2009. It tasked DoD "to issue comprehensive guidance on life-cycle management and the development and implementation of product support strategies for major weapon system" and established the requirement for PSMs: "The Secretary of Defense shall require that each major weapon system be supported by a product support manager… ." (Figure 1, on page 10).

It's the Law!
The FY 2010 NDAA language was subsequently codified into statute (10 U.S.C. Section 2337). This

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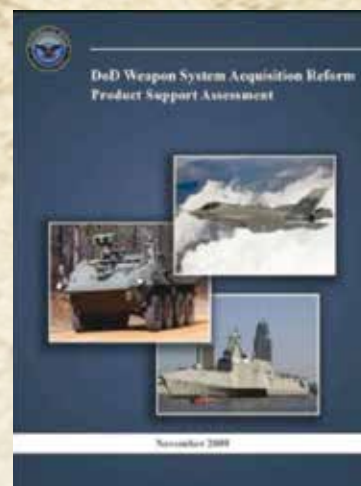
Figure 1. Product Support Business Model
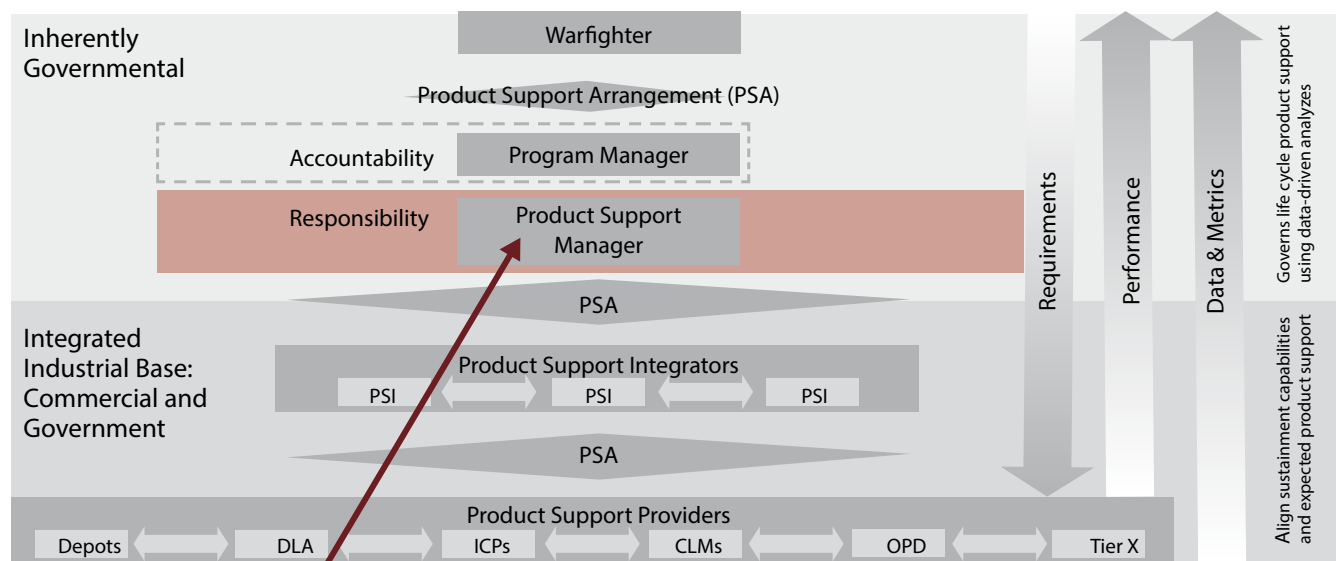
"The Product Support Manager: A Catalyst for Life Cycle Management and Product Support Success"
Ms. Sue Dryden, Deputy Assistant Secretary of Defense for Materiel Readiness

Key to abbreviations: DLA=Defense Logistics Agency; ICP=inventory control point; OEM=original equipment manufacturer; DPO= distribution processing owner; Tier X=other.
Source: *Product Support Manager Guidebook*, Department of Defense.

section is titled "Life-Cycle Management and Product Support," and tasks the Secretary of Defense to "issue and maintain comprehensive guidance on life-cycle management and the development and implementation of product support strategies for major weapon systems" and to "require that each major weapon system be supported by a product support manager." Nine specific responsibilities for the PSM were called out, with a 10th being added in Section 803 of the FY 2014 NDAA.

Amplifying Guidance

In addition to Title 10 U.S.C. Section 2337, the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD[AT&L]), also released Decision-Type Memorandum (DTM) 10-015 titled "Requirements for Life Cycle Management and Product Support" in October 2010. Its goal was to implement and institutionalize the requirements of Section 805, with the intention of incorporating these policy requirements into various other DoD instructions. The DTM was slated to expire on April 4, 2011, but was continued by several subsequent extensions. (Note: The issuance of the Interim DoD Instruction (DoDI) 5000.02 in November 2013 officially rescinded DTM 10-015.)

The DTM articulated additional requirements regarding the PSM, as well as important amplifying information regarding the role's implementation. Major requirements were:

• Component Acquisition Executives (CAEs) shall identify and assign a PSM within every ACAT (Acquisition Category) I and ACAT II program, prior to but no later than program initiation and to former ACAT I/II programs that are post-initial operating capability (IOC) or no longer have program managers (PMs) reporting to CAEs.

• The position of PSM shall be performed by a properly qualified military Service member or full-time employee of the DoD. (Note: Subsequently captured in Title 10 U.S.C. 1706, "Government performance of certain acquisition functions.")

• The PSM will be designated as a key leadership position (KLP) for all Major Defense Acquisition Programs and major weapon systems and designated a critical acquisition position (CAP) for all other major weapon systems.

• The PSM will be an integral part of the program management team and will report directly to the PM.

Additional PSM resources developed in the 2010–2014 timeframe as a result of the November 2009 Product Support Assessment, including the Product Support Business Model (PSBM) tool, are listed in the sidebar on the next page. The special issue of the *Defense AT&L* magazine in March–April 2012 included multiple articles on PSM implementation such as "The Product Support Manager: A Catalyst for Life Cycle Management and Product Support Success" and "Professionally Developing World-Class Product Support Managers."

Mandatory Training Requirement

In support of the 10 U.S.C. Section 2337 requirement, the Office of the Deputy Assistant Secretary of Defense for Logistics and Materiel Readiness (ODASD[L&MR]), acting in the role as LCL Functional Leader, tasked the Defense Acquisition University (DAU) to develop an executive-

level course to specifically train PSMs in February 2014. This 2-week course, originally titled LOG 365, "Executive Product Support Manager Course," was developed to fulfill assignment-specific training requirements. Subsequently renumbered LOG 465, the memo stated that the course is mandatory for all assigned DoD PSMs for all ACAT I, ACAT II programs, former ACAT I/II programs that are post-IOC or no longer have a PM reporting to a CAE. And, while not mandatory, ACAT III program PSMs may attend if endorsed by their senior executive. The ODASD(L&MR) memo was superseded by memo in February 2016. It clarified that the course was also mandatory for PSMs of ACAT IA Major Automated Information Systems programs and for defense acquisition workforce members who have been prequalified by the LCL PSM KLP Joint Qualification Board.

The LOG 465 Executive PSM Course is offered quarterly at DAU's Fort Belvoir, Virginia campus. It includes a wide range of DoD, Service and industry guest speakers, as well as executive-level case studies that challenge PSMs with real-world sustainment scenarios. Students develop and defend creative and comprehensive solutions within their dedicated cohorts.

LOG 465 has been widely praised by the PSMs, and has been granted three graduate credit hours in product support man-

Additional PSM Resources

- Product Support Business Model (PSBM) tool (https://www.dau.mil/tools/t/Product-Support-Business-Model)
- *PSM Guidebook* (https://shortcut.dau.mil/JST/psm-guidebook)
- *DAU Guidebook Suite* (https://www.dau.mil/tools/p/integrated-Product-Support-Guidebook-Suite)
  — *PBL Guidebook*
  — *(Independent) Logistics Assessment (ILA) Guidebook*
  — *Product Support BCA Guidebook*
  — *Operating and Support (O&S) Cost Management Guidebook*
- *Defense AT&L* magazine March–April 2012 Product Support Special Issue (http://www.dau.mil/library/defense-atl/p/Defense-ATandL--March-April-2012)

agement or business management by the American Council on Education (ACE).

Government Accountability Office Studies
Study Number 1—2014

Four years after enactment of the PSM law, the Government Accountability Office (GAO) performed an audit to examine (a) the steps that the DoD and the military Services had taken to implement PSMs for major weapon systems and (b) the extent to which DoD has evaluated how PSMs are affecting life-cycle sustainment decisions. Their findings were mixed.

They noted that:

- The military Services had assigned PSMs to almost all (98 percent) of their major weapon systems.
- DoD and all of the Services have taken some steps to develop a comprehensive career path and associated guidance to develop, train and support future PSMs, but at that time there was no plan to implement and institutionalize a comprehensive PSM career path.
- DoD's PSM implementation guidance was not centralized and product support personnel "may be hindered in their ability to easily access and implement such guidance."
- DoD guidance lacked detail and contains a potentially unclear provision, and personnel may confuse the responsibilities of PMs and PSMs.
- The Army had not yet adequately clarified the roles and responsibilities of certain product support personnel who support PSMs for the sustainment portion of the life cycle.

GAO noted the second and third items listed above because Interim DoDI 5000.02 did not discuss PSMs at the same level of detail as the DTM 10-015, stating specifically that the responsibilities of PSMs were not listed in the new guidance. They clarified that the new instruction discusses the roles and responsibilities of the PM at length, but only alludes to the responsibilities of PSMs, citing Section 2337 of Title 10, U.S.C. Service representatives consistently stated that the guidance at that time was not sufficiently clear regarding product support and the implementation of PSMs.

As a result of the GAO report, ODASD(L&MR) released a memo in May 2015, titled "Product Support Manager Career Development Roadmap" (Figure 2, next page).

Additionally, Army officials worked to clarify the roles and responsibilities of sustainment personnel in order to enable PSMs to effectively perform their duties while simultaneously

Figure 2. Professional Development and Career Professional Roadmap

Executive Level: Senior Executive Service /Flag/General Officer
- Senior Product Support Logistics Leader
- Assignments: Program Executive Officer (PEO), OSD Staff, HQ Staff, Joint Staff, Service Product Support Competency Lead

"Graduated" Prod. Support Managers (PSMs) (GS-15/NH-4/O-6)
- Continued career progression and leadership success
- Future or assigned program managers (PMs)
- Positions: Center, major command, PEO senior funcational lead
- Perform in complex, challenging situations
- Ability to inspire and lead diverse teams

Senior Program Logistician (GS-14/15/NH-4/O-5)
- Desired Training: LOG 365, ACQ 405, ACQ 450, ACQ 452
- Experience: 10 years desired (5 in program office)
- Education: Masters (and Senior Service School) recommended
- Assignments: ACAT I MDA/MAIS PSMs
- Meet KLP position requirements and be KLP board selected
- Demonstrated ability to lead multidisciinary teams

Emerging Logistics Leaders (GS-14/NH-4/O-5)
- Desired Training: LOG 365, PMT 252, PMT 401
- Experience: Across IPS elements; Acquisition and Sustainment
- Education: Bachelors (or higher) recommended
- Assignments: Supervisory, competency lead, ACAT II PSMs
- Cross-DAWIA Certification in second career field recommended

Expert Practitioner Logistician (GS-13/NH-3/O-4)
- Desired Training: LCL Level III Certification and Core Plus Guide
- Experience: LCL in positions across life cycle
- Education: Bachelors (or higher) desired
- Assignments: Leadership Position, IPS Element Mgr., ACAT III PSM
- Cross-DAWIA Certification in second career field beneficial

Journeyman Logistician (GS-12/NH-3/O-3)
- Desired Training: LCL Level II certification and Core Plus Guide
- Experience: Breadth/depth across the product support elements and weapon system life cycle
- Education: Bachelors desired
- Assignments: Broadening across IPS elements, PMO, HQ staff

Entry-Level Logistician (GS-5/7/9/11/O-2)
- Desired Training: LCL Level I Certification and Core Plus Guide
- Assignments: Working one or more IPS elements (e.g., maintenance, supply, LCL, distribution and transportation)

Key: ACAT=Acquisition Category; CAP=critical acquisition position; DAWIA=-Defense Acquisition Workforce Improvement Act; HQ=headquarters; IPS=integrated product support; KLP=key leadership position; MAIS=major automated information system; MDAP=major defense acquisition program; OSD=Office of the Secretary of Defense; PMO=program management office.

Source: Department of Defense

providing sustainment support to the Army's weapon systems' life cycles.

It should be noted, however, that the PSM assignment and reporting requirements from DTM 10-015 ultimately were not incorporated into either DoDI 5000.02 or the July 2017 revision of DoDI 5000.66. This information resides in Appendix D of the *PSM Guidebook–PSM Training, Certification and Experience Requirements.* As a guidebook, this information remains guid-ance, rather mandatory/policy. In essence, the requirements outlined in the original DTM have never been ensconced into DoD policy.

Study Number 2—2017
Three years later, GAO performed a follow-up study to re-view DoD's progress in implementing PSMs and integrating them in the life-cycle management of major weapon systems, to describe factors that PSMs identified as critical to their

ability to influence sustainment-related decisions during weapon system development and to identify problems for their ability to influence these decisions. GAO also tracked DoD's progress on implementing recommendations from its 2014 report.

GAO executed its audit via seven focus groups with PSMs from all the Services. They found that enabling factors for PSMs included teamwork and collaboration, early implementation of the PSM position, and organizational support and emphasis on sustainment. The PSMs specifically noted that the information and training provided by DAU were "excellent," and that DoD's annual PSM conference was a helpful forum for networking with other PSMs. The PSMs stated that they were generally able to perform their PSM duties, but they identified major challenges relating to resource constraints, competing priorities, and differing approaches to institutionalizing the PSM position as hindrances to their ability to influence sustainment-related decisions.

GAO also noted that DoD and the Army had implemented two of the five recommendations in their 2014 study. They remarked upon DoD's comprehensive PSM career path and associated development and training guidance, and the Army's revised guidance to clarify the Army-wide roles and responsibilities for the sustainment portion of the life cycle of major weapon systems. They also stated that additional steps were still needed to implement the remaining three recommendations:

- DoD has not fully implemented GAO's recommendations to systematically collect and evaluate information on the effects, if any, that PSMs are having on life-cycle sustainment decisions.
- DoD has not issued clear, comprehensive, centralized guidance regarding the roles and responsibilities of PSMs.
- The Army has not fully implemented a recommendation aimed at ensuring that PSMs have visibility over sustainment funding.

While no official recommendations were made as an outcome of the 2017 report, GAO did note that these three items above, if fully implemented, "could further institutionalize the role of PSMs and thereby help to increase their influence on sustainment-related decisions."

What's Next?
The recent organizational change from Office of the USD(AT&L) to the new Under Secretary of Defense for Acquisition and Sustainment likely will add emphasis to the importance of sustainment and related product support efforts—including focus on the logistics workforce in general and the PSM in particular. Furthermore, the Section 809 Panel, created in FY 2016, is tasked with finding ways to streamline and improve the defense acquisition process.

In order to cover every aspect needed to improve the defense acquisition process, the Section 809 Panel is broken up into

> **Participants from all the Services gave examples where they couldn't address all PSM functions due to lack of resources—often because constrained resources were applied to solve current acquisition issues.**

teams that analyze specific topics. Team Ten is addressing the workforce and considering "statutory and regulatory reform that would foster a culture of authority and accountability in the acquisition process, enable the workforce to serve the mission free of unnecessary obstacles." In the coming months, the panel will partner with Congress, the DoD and industry in support of further efforts to streamline acquisition to better enable DoD to meet its strategic warfighting goals. This will include the workforce issues being tackled by Team Ten, which will, presumably, include critical PSM issues. As the "catalyst for life cycle management responsibly" (as stated by the former ODASD[L&MR]), better enabling this key member of the workforce would be a true force multiplier.

Listening to PSMs
While no official action items were identified from the 2017 GAO study, the three most significant challenges identified by the PSM community are worthy of more focused attention. As Learning Director, former PSM and instructor responsible for LOG 465, DAU's Executive PSM Course, I have shared the classroom with more than 200 PSMs over the last few years, and the comments below are deeply resonant.

Resource Constraints: PSMs stated that funding and personnel resource constraints hindered their ability to influence sustainment-related decisions during weapon system development. Participants from all the Services gave examples where they couldn't address all PSM functions due to lack of resources—often because constrained resources were applied to solve current acquisition issues. While resource constraints during the acquisition process affect everybody, it is still too easy to trade-off investments in design improvement or in analytical tools that could better inform the decision-making process. We must be better at making the needed investments in our collective future.

Competing Priorities: PSMs told the GAO that PMs did not strongly emphasize the sustainment portion of a program's life cycle, because it was focusing on performance in the near-term—even though DoDI 5000.01 clearly states that "The PM

shall be the single point of accountability for accomplishing program objectives for total life-cycle systems management, including sustainment." The PSMs noted that this is because a program's success is not measured by sustainment. Again and again, PSMs state that program management often has a near-term focus when managing a program. PMs are in the job for 3 or 4 years and then move on. As a result, decisions are made to meet short-term goals. This makes it very difficult for PSMs to successfully advocate for long-term sustainment considerations and justify the value of this approach. While DoD has taken some actions to improve these longstanding systemic issues, feedback from PSMs indicate that these problems persist.

Differing Approaches to Implementing PSMs: The PSM position has been implemented in a wide variety of ways, based on differing understandings of PSMs' roles and responsibilities. Some PSMs were moved into these positions but were still responsible for other related, but different, logistics' responsibilities. Other PSMs talked about their responsibility for a portfolio of programs, such that they were challenged to provide adequate oversight for all of them. Another common theme that was shared is that PMs often do not understand the PSM's roles and responsibilities. Additional training of the PMs was recommended, as was continued advocacy by the PSM community, and more centralized communication of PSMs' implementation guidance. This communication should include factors previously addressed in the rescinded DTM 10-015, such as the enabling requirement that the PSM report directly to the PM. It has been proven that a direct reporting construct helps promote healthy and open relationships, build stronger bonds of trust, and more clearly articulate the PM's support of sustainment efforts.

Recommendations

In this era of acquisition streamlining and the Section 809 panel, we must think boldly. To truly empower this indispensable member of our workforce, permit me to posit a list of potentially transformative recommendations. These opinions are my own, and not necessarily those of either DoD or DAU:

- Incorporate PSM implementing and assignment information that currently resides in the PSM Guidebook into the next update to DoDI 5000.66. This should include the previous PSM-to-PM direct reporting requirement.
- Perform a thorough resource analyses of PSM assignments in accordance with approved DoD and Service manpower requirements development processes to determine the need to add/reallocate PSMs. As part of the analysis, assess duties PSMs may be performing in addition to statutory requirements and help determine appropriate tasking. There may be areas (such as Financial Improvement and Audit Readiness [FIAR] endeavors for example) which may be placing a disproportionate burden on the PSM community.
- Determine if the right skills are being applied relative to life-cycle requirements. Are there sufficient numbers of PSMs

assigned during the early stages of systems life cycle, for example, with the requisite design interface and logistics engineering experience? Are there an adequate number of PSMs in the Operating and Support phase with sustainment contracting and sustaining engineering experience? Also determine whether PSM subspecialty certifications under the Defense Acquisition Workforce Improvement Act (DAWIA) would be prudent in these and other critical areas.
- Determine whether PSMs have sufficient budget visibility and accountability. This includes funding for logistics products (i.e., technical data, training, maintenance plans, etc.), as well as analytical tools and program-specific subject-matter expert support.
- Consider extending DAWIA Level I life cycle logistics certification training requirements (LOG 100 Life Cycle Logistics Fundamentals, LOG 102 System Sustainment Management Fundamentals, and LOG 103 Reliability, Availability and Maintainability) to the Systems Engineering, PM, Contracting, Business Cost Estimating and Financial Management career field members assigned to ACAT level I/II programs.
- Develop sustainment baselines based on Independent Logistics Assessments (ILAs) as executed in accordance with DoDI 5000.02 and Service-level requirements. Track, report and review these baselines as well as improvement plans at the CAE or other appropriate Milestone Decision Authority level.
- Expand upon and strengthen the senior logistics roles currently captured within the program executive offices and/or commanders of systems, logistics, or materiel commands. Ensure that those leaders with logistics management and oversight responsibility for programs and PSMs within their organization's portfolio are fully empowered and accountable to attain program sustainment milestones and system sustainment requirements. This includes reviewing/approval/tracking of Life Cycle Sustainment Plans/Capability Support Plans/ILA baselines to ensure proactive design influence activities and fielded hardware, software, and life-cycle support effectiveness, and serving as their PSM community's functional lead.

Conclusion

PSMs provide a potent and critical means for helping ensure that DoD delivers affordable readiness to our warfighters. The PSM is entering a new phase, and after 8 years, can no longer be considered "new." A renewed focus on streamlining processes and eliminating obstacles is needed in order to "foster a culture of authority and accountability" in the PSM community. DoD can unleash the power of our PSMs by providing them the resources, tools and authorities they need to be successful. And PSMs need to be emboldened to fight for long-term sustainment considerations. PSMs are mandated by law; let's continue to work to maximize their potential, while developing, fielding and sustaining capable, affordable, supportable and available weapon systems in support of our soldiers, sailors, airmen and Marines.
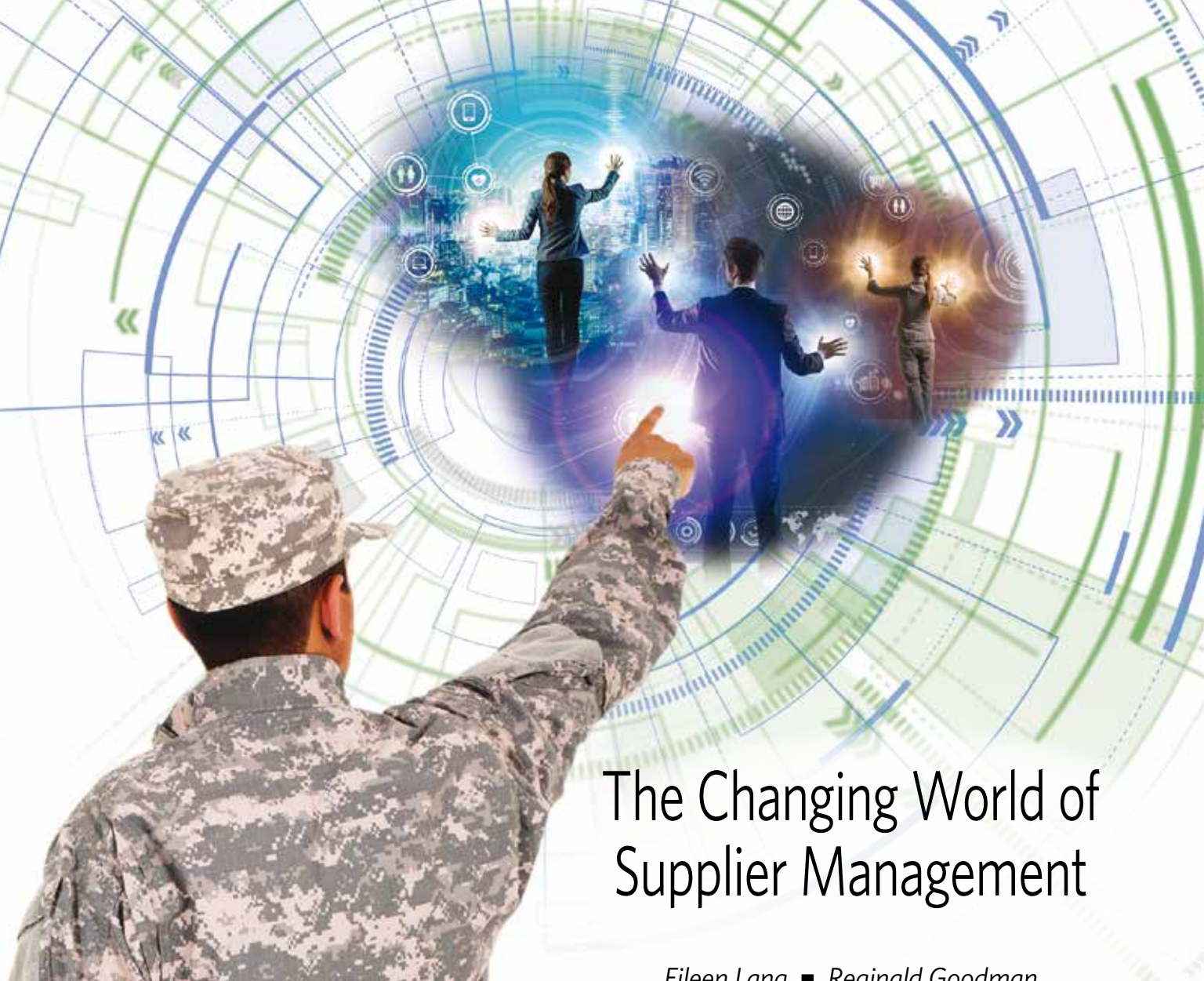
The Changing World of Supplier Management

Eileen Lang ■ *Reginald Goodman*

Over the last two decades, outsourcing more and more has become a foundational strategic component of business models used by the prime contractors supporting naval aviation.

Twenty years ago, Naval Air Systems Command (NAVAIR) prime contractors were airframe/platform centric providers making on average about 60 percent of their product in-house and buying (subcontracting) about 40 percent. Today, primes are more of a "system solution" provider making approximately 20 percent and buying approximately 80 percent (Figure 1). Due to this significant change, NAVAIR made it an imperative to understand the impacts of prime contractors shifting their efforts, knowledge, data, labor, costs, risks and opportunities to their subcontractors. Active insight into supplier performance can be key to the ability of a program manager (PM) to successfully plan and execute his or her program. Therefore, it is important for the government to understand and mitigate the inherent risks posed by a prime contractor's outsourcing strategies.

Lang *leads the NAVAIR Supplier Analysis and Management Support effort. She has 26 years of experience providing Earned Value Management support to acquisition programs.* **Goodman** *is assigned to the NAVAIR Cost Estimating and Analysis Department. He has 41 years of Department of Defense experience in audit and acquisition functions.*

When NAVAIR followed the money in this rapidly changing landscape of supplier management, it quickly became clear why outsourcing has become more prevalent. A prime contractor's outsourcing decisions largely are based on its overall business strategy and the industry's technical capabilities. Primes have widely adopted outsourcing as a method to reduce investment costs, distribute associated risks, increase return on invested capital, and leverage sub-tier supplier capabilities that, in turn, have expanded to accommodate the increased demand.

However, from the government's perspective, understanding a prime contractor's supply management strategy and the impact of their strategies on a program's cost, schedule and technical performance must be considered when assessing a program's plan and the associated execution risks. While prime contractors are responsible for overseeing and managing the supplier network that provides a product and/or service, government program officials provide oversight and contract surveillance duties on Department of Defense (DoD) prime contracts to ensure that the prime contractor performs adequate subcontractor management.

A clear contribution to this shift was the substantial consolidation of defense contractors occurring during the 1990s. Examples include Northrop Aircraft acquiring Grumman Aerospace in 1994, creating Northrop Grumman; Martin Marietta merging with Lockheed Corporation to form Lockheed Martin in 1995; and McDonnell Douglas merging with Boeing in 1997. This heavy consolidation coincided with a period in which prime contractors strategically increased the degree and complexity of effort that was outsourced—effectively transitioning the contractors from airframe and platform-centric providers to the system solution providers of today. Ongoing budget reductions, perceptions of declining defense procurement demand, and uncertain prospects for new major programs re-enforce the contractors' strategy of improving efficiency and reducing investment risk exposure through such changes as:

- Moving product or process from make to buy
- Changing, consolidating, or acquiring suppliers
- Adjusting the products or processes a supplier provides

- Expanding the scope of what is outsourced to include sourcing technical design, buying systems, etc.
- Changing the processes and equipment suppliers use on programs
- Moving supplier product or processes from one location to another

These changes have significantly impacted program cost, schedule and technical performance, requiring additional consideration when assessing the program plan and associated program execution risks. Multiple opportunities exist to improve performance on programs through risk identification and mitigation. Government PMs must leverage available tools to meet program cost, schedule and technical goals and objectives.

Leveraging Earned Value Management to Assess Risks

Weapons systems acquisition is a complex business complicated by the motivations of the customer (government) and the market (contractor). Government PMs are obligated to the warfighter and must deliver the right capability on time while meeting their fiduciary responsibility to the taxpayer to control cost growth.

On the other hand, contractors are obligated to their shareholders and must enhance wealth by meeting financial performance objectives (i.e., sales, profits, revenue growth, cash flow, etc.). To illustrate this point, compensation data for the top five executives (publicly available in 2013 company filings with the Security Exchange Commission filings) reveal

Figure 1. A Changing Landscape

1994
40% Buy
60% Make
Platform Centric Provider

2007
60% Buy
40% Make
Integrated Systems Provider

201X
20% Make
80% Buy
System Solution Provider

Less Investment & Greater Returns
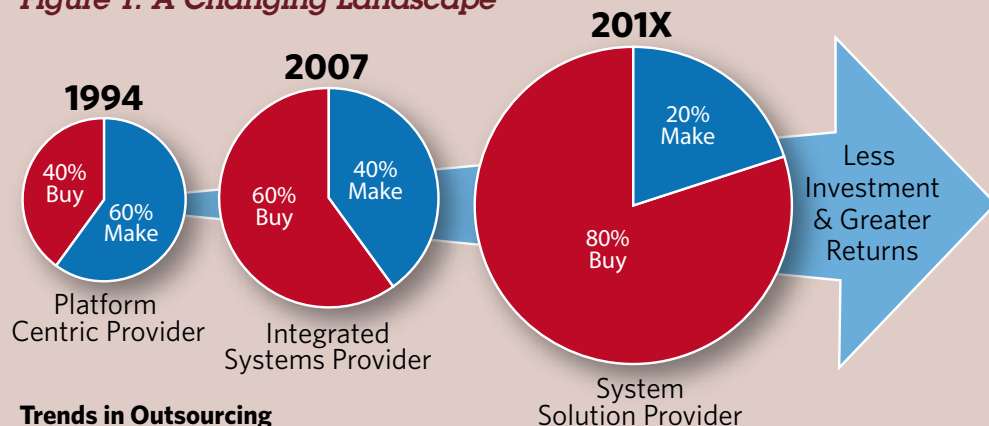
Trends in Outsourcing
While Major Primes have Consolidated—Their Business Strategy Has Changed
- From a "platform centric" provider strategy in 1994
- Through "integrated systems" provider strategy in 2007
- To "system solution" provider strategy today—80% Buy and only 20% make

Why Such a Significant Shift?
Outsourcing is a key strategy for maximizing return on invested capital and cash flow driven by mandate to maximize shareholder value.

Figure and tables by Naval Air Systems Command and Department of Defense

that Customer Satisfaction is 2 percent of Executive Incentive Award Criteria while Financial Metrics and Stock Price are 61 percent and 27 percent, respectively. Clearly, this reveals divergent priorities that do not align in a number of areas (such as cost/schedule control, shareholder return, rewards, risk management, etc.), and makes it extremely challenging to find common goals.

Fortunately, many tools are available to DoD PMs to help them proactively manage programs. Since the early 1960s, Earned Value Management (EVM) is one of those tools used for program management by the DoD, the rest of the federal government and the commercial sector. It is a program management technique for objectively measuring program performance and progress. Because PMs ultimately are responsible for the cost, schedule and technical performance of their programs, an EVM System (EVMS) integrates these parameters for optimum program planning and control. For DoD programs, use of EVM is required on all cost or incentive contracts of $20 million and more. As a widely accepted industry best practice prescribed in the Electronic Industries Alliance Standard-748 EVMS (EIA-748), EVM provides a number of tools that help government and industry PMs assess cost, schedule and technical progress. Two of the EVM tools assess program risk, specifically the Integrated Baseline Review (IBR) and the Schedule Risk Assessment (SRA). When planning and performing these reviews or assessments, it is important that IBR and SRA assessment criteria, process steps and questionnaires include specific measures to access the impact of company supplier sourcing and management strategies.

Required by DoD policy when EVM is determined to be applicable on a contract, IBRs are reviews of contractors' Performance Measurement Baselines (PMBs). It is crucial that the PMB captures all contracted work scope and the IBR is the primary tool for helping the government PM make that determination. The objectives of the IBR are to gain insight into the cost, schedule, technical, management processes and resource risks associated with a project. PMs are required to conduct an IBR within 6 months of contract award, or exercise of options, and major modifications. These timeframes are essential in identifying program execution risk early in order to minimize cost, schedule and technical risk. Also, this timing allows the IBR to provide management and staff personnel a continuous method to develop and maintain an understanding of the project objectives, the PMB, the management processes, and the project risks

and opportunities. At NAVAIR, IBRs are conducted using a five-step process:

- Joint Government/Prime Management Systems Training
- Prime Management Systems Assessment
- Subcontractor IBRs
- Schedule Risk Assessment
- Total Contract IBR

The Total Contract IBR (the fifth step above) typically is conducted onsite at the contractor's facility and is focused on discussions or interviews with contractor Control Account Managers (CAMs) who are responsible for all work required to meeting contractual requirements. These discussions are not unlike a grade school "show and tell" where the CAMs demonstrate through explanation and documentation that they have captured the contract scope of work and are executing appropriate project management controls within the budget and resources they have been allocated. The government officials lead the discussions using questionnaires developed prior to the IBR that include questions associated with risks in five areas (cost, schedule, technical, management processes and resources). Based upon the outcome of the discussions, the government program officials make an assessment of risk in the five areas using a set of risk criteria presented in Table 1.

It is very important that both the questionnaires and risk criteria consider the contractor supplier management strategy. For example, at NAVAIR we included the following selected questions:

- Are subtier suppliers on contract?
- How is supply chain managed?
- Have critical suppliers been identified and evaluated?

It should be apparent that negative responses on any of these three questions could result in potential significant risk to program cost, schedule and technical objectives—a risk that

Table 1. Integrated Baseline Review Risk Evaluation Criteria

Low	Medium	High
1. Contractor has developed a comprehensive technical baseline plan that covers all significant efforts within the statement of work. No material effect on Key Performance Parameters (KPPs) or Technical Performance Measurements (TPMs). Consistent with contract requirements, and has adequate definition and identification of task in baseline.	1. Technical plan does not cover some effort within the statement of work, but is consistent with most contract requirements, and has adequate definition and identification of tasks in the baseline. Any omitted tasks have no material effect on KPPs/TPMs.	1. Technical plan does not include significant efforts within the statement of work, is not consistent with contract requirements, lacks adequate definition and identification of tasks in the baseline, or will not meet KPPs/TPMs as currently planned. Will not meet KPPs/TPMs as currently planned.
2. All significant work scope responsibility is properly allocated to the performing organization that controls budget and schedule.	2. Most of the significant work scope responsibility is properly allocated to the performing organization that controls budget and schedule.	2. Work scope responsibility, in many cases, is not properly allocated to the performing organization that controls budget and schedule.

would need to be mitigated. Analysis of the NAVAIR IBR Findings Database reveals that 29 percent of IBR findings/risks are associated with supplier management issues.

The foundation for an effective EVMS is the Integrated Master Schedule (IMS). A program's IMS is a powerful planning, control and communications tool that, when properly executed, supports time and cost estimates, opens communication among personnel involved in project activities, and establishes a commitment to project activities. The IMS is required when EVM is placed on DoD contracts and typically also is required on most other contracts when EVM is inapplicable. The IMS' purpose is to provide a communication tool to improve the execution of a project, coordinate work efforts, assist in identifying and mitigating risks, and capture opportunities for decision makers.

The IMS should represent the discrete effort for entire project and be the focal point in the program management's business rhythm. Program teams use the schedule as a tool to communicate and coordinate their tasking identifying what, when, and how things might occur and who will perform them.

The SRA helps PMs effectively use the IMS and understand prime contractor outsourcing strategies. The SRA is a tool and process that identifies technical and programmatic opportunity and/or risk in a program. It uses statistical techniques to identify and quantify technical, programmatic and schedule risks in a program and quantify the impact of those risks on the program's IMS.

When conducting SRAs, government program officials must ensure that SRA criteria, process steps and questionnaires include specific measures to assess the impact and risks of company supplier sourcing and management strategies. For example, the SRA Risk Analysis Discussion Form used at NAVAIR includes 145 discussion questions, 73 of which focus on the prime contractor's management of its suppliers.

Note that as with the previously discussed IBR questionnaire, negative responses to these selected questions could pose significant risk to meeting program cost, schedule and technical objectives.

Table 2 shows areas of interest that were very useful in planning for NAVAIR IBRs and SRAs and provides examples of areas to focus attention to properly determine the impact and risks along with ensuring the prime contractors manage programs effectively. We encour-

age all government program teams to use it when conducting IBRs, SRAs, as well as during periodic program reviews with the prime contractor.

Outsourcing management cannot be considered effectively unless one correctly establishes acquisition reporting requirements in order to receive the information needed to effectively manage EVM work flow (such as Integrated Program Management Reports (IMPRs) and IMS. The requirements may be tailored based on program risk and the PM's specific needs. Incorporating requirements and changes after contract award is typically more challenging and expensive as contractors resist scope growth and typically advocate scaling back requirements as much as possible.

DoD budget cuts (e.g., the Budget Control Act of 2011, etc.), and inaction by Congress in the form of routine Continuing Resolutions in the place of comprehensive fiscal year spending bills, have resulted in inefficiencies and added risk to weapon system acquisition programs. Now more than ever, government PMs need to take advantage of any opportunity available to avoid program cost and schedule growth. Understanding and addressing contractor supplier management strategies is one of the opportunities that PMs should maximize.

Contractor supplier management strategies vary from one company to another because of various factors that ultimately promote and benefit their financial success. A host of tools and support personnel are available to government PMs to help them manage their programs within the framework of the principles of project control and have an absolute responsibility to do so on behalf of the warfighter and taxpayer. &

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Table 2. Supply Chain Management—Sample Areas of Interest

Summary Areas of Focus		
	Supply Chain Strategy	What is the contractor's supply strategy and how might it impact NAVAIR's program?
	Supply Chain Management Organization	How is supply management organized? Who does what to manage and support suppliers?
	Make/Buy Plan/ Decision	What is the contractor's make and/or buy plan? What is the benefit or risk to NAVAIR?
	Source Selection/ Contract	How does the contractor validate and select suppliers? Are they on contract for low risk delivery?
	Technical Data	Has the technical data been provided to suppliers? Do suppliers have the information they need?
	Purchase Order	Has the supplier work been authorized? Purchase orders received by suppliers in a timely manner?
	Supplier Management	How does contractor monitor, manage and support suppliers? Are suppliers receiving required support?
	Corrective Action	What are the issues and/or risks requiring action? What are the risk mitigation or corrective action plans?

Program Protection Plan

A Practitioner's View

Peter Merrill ■ *Howard Harris*
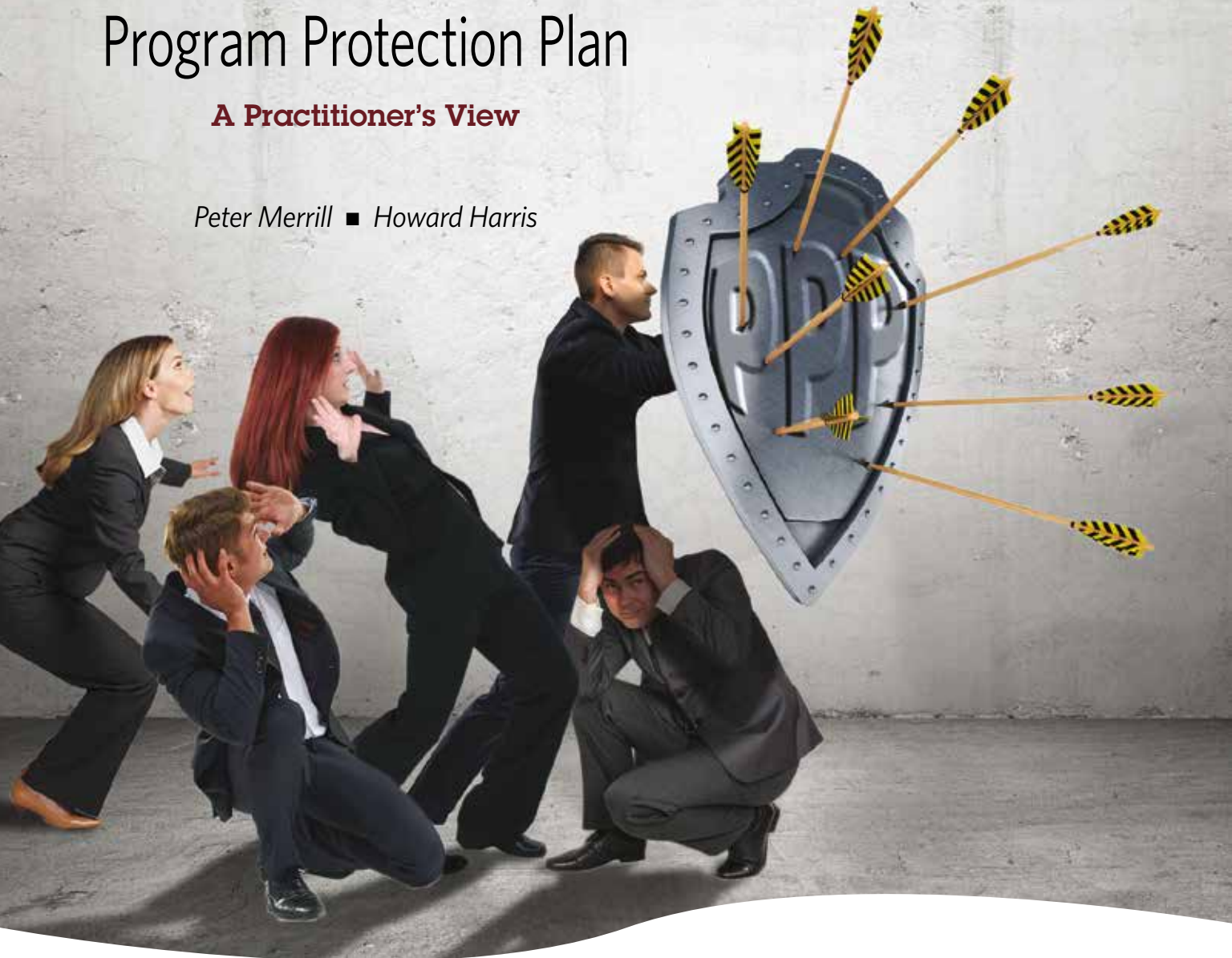
S everal years have passed since the announcement and inception of the new Department of Defense (DoD) program protection process. In 2011, the DoD program protection process was changed to integrate security into Systems Engineering, which enables the application of science and engineering in identifying vulnerabilities and completing an associated risk-cost-benefit trade study. The expanded role of the program protection process enables the most appropriate mix of measures to protect the information, components and technologies from known security threats and attacks.

This following Question and Answer series provides some lessons learned from a program protection practitioner's experiences.

Merrill *is a retired lieutenant colonel of the U.S. Army Signal Corps and president of Merrill Trusted Solutions, a program protection consulting company in San Diego, California.* **Harris** *is a professor of Program Management at the Defense Acquisition University's West Region in San Diego.*

Q. What is the purpose of the Program Protection Plan (PPP)?

A. The PPP is much more than a document. It is used by programs to coordinate and integrate all security efforts throughout the entire system's life cycle. A good PPP is a current, meaningful and usable reference that documents the decisions of the program manager (PM) to ensure that there is adequate protection against hostile activities such as reverse engineering of Critical Program Information (CPI) and malicious insertion of hardware and software components. It is critical to integrate program protection planning into the systems engineering process. DoD Instruction (DoDI) 5000.02, Change 3 requires that the PPP document be submitted five times for Milestone Decision Authority (MDA) review and approval as shown on Table 1.

Further, the DoD Directive on Cybersecurity in the Defense Acquisition System requires that the PPP continue to be reviewed and approved by the appropriate sustainment program manager. The PPP document includes five appendices: Security Classification Guide (SCG), Counterintelligence Support Plan (CISP), Criticality Analysis, Anti-Tamper (AT) Plan, and the Cybersecurity Strategy. Table 2 outlines this document and appendices.

Q. How can program protection be made more effective?

A. The DoD program protection process works effectively only if the procedures are followed and implemented. The process should start prior to Milestone A, and the program protection lead (ideally the System Security Engineer [SSE]) should be an active participant in the system design and all technical reviews.

For example, to influence the project's design, the SSE should participate in the design trade-offs and be present during the System Requirements Review (SRR) to review the security requirements with the stakeholders. Experience shows that many programs do not start early enough with PPP requirements, nor do they have an SSE as part of their systems engineering integrated product team (IPT).

As another example, during the system specification review, the following should be accomplished:

Table 1. Program Protection Plan Life-Cycle Events

Information Requirement	Program Type				Life-Cycle Event								Source	Approval Authority
	MDAP	MAIS	ACAT		MDD	MS A	CDD Val	Dev RFP Rel	MS B	MS C	FRP/FD Dec	Other		
			II	≤III										
Program Protection Plan (PPP)	*	*	*	*		*		✓	✓	✓	✓		DoDI 5200.39 (Ref. (ai)) DoDI 5200.44 (Ref. (aj)) Para 13a in Enc. 3, this instruction	MDA
Regulatory. A draft update is due for the Development RFP Release decision and is approved at Milestone B. The PPP includes appropriate appendices or links to required information. See Section 13 in Enclosure 3 of this instruction.														

Source of tables and figure: DoDI 5000.02

Table 2. PPP Sections and Appendices

Sections	Appendices
Section 1: Introduction—Purpose and Update Plan Section 2: Program Protection Summary Section 3: Critical Program Information (CPI) and Critical Components Section 4: Horizontal Protection Section 5: Threat, Vulnerabilities and Countermeasures Section 6: Other System Security-Related Plans and Documents Section 7: Program Protection Risks Section 8: Foreign Involvement Section 9: Processes for Management and Implementation of PPP Section 10: Processes for Monitoring and Reporting Compromises Section 11: Program Protection Costs	Appendix A: Security Classification Guide Appendix B: Counterintelligence Support Plan Appendix C: Criticality Analysis Appendix D: Anti-Tamper Plan Appendix E: Cybersecurity Strategy

- Confirm or update potential CPI.
- Reassess the risk associated with each potential CPI.
- Analyze the functional design for vulnerabilities and identify protections to mitigate the vulnerabilities.
- Update protection requirements and identify design alternatives for the functional baseline.

Even under the best circumstances, the PPP remains largely misunderstood. For example, many PMs identify the cybersecurity person, who is usually not the most appropriate PPP development leader, either because the most appropriate skill set is lacking, or the person already is very busy with the Risk Management Framework and other cyber activities. Some managers have found that they need a specialist to perform this analysis but then select the Information System Security Officer as the overseer. As a best practice, the systems engineer should take overall responsibility for the program's security, and the lead role for PPP development should be assigned to the SSE (a systems engineer trained in system security techniques) working directly for the systems engineer. Table 3 lists the responsibilities for the three key roles associated with PPP development.

Q. How does the SSE work with the program management office (PMO) and vendors to ensure that the proper program protection requirements are implemented?

A. The SSE should assist the PMO in writing the system specifications and the Statement of Work (SOW) to include all required security requirements. The Deputy Assistant Secretary of Defense for Systems Engineering (DASD[SE]) document, "Suggested Language to Incorporate System Security Engineering for Trusted Systems and Networks into Department of Defense Request for Proposals," dated January 2014, is an excellent source for developing the SOW's security requirements. The SOW's program protection-related requirements should address items such as identification of logic-bearing components (i.e., hardware, software, firmware that processes or stores information), software assurance, Supply Chain Risk Management, cybersecurity, AT, and criticality analysis.

In developing the system, the contractor can resource and implement program protection only as directed in the Request for Proposal (RFP). Regardless of how well the PPP document is written, the contractor effort is not affected unless the SOW includes the following types of contractual requirements:

- What the system must do, via the system specifications.
- How the contractor shall develop the system, via the SOW.
- The additional analyses required, via the SOW.

This is an iterative process. As the system requirements, design and implementation are defined and further refined, new vulnerabilities may be discovered and others eliminated. As each successive RFP is developed, it is necessary to update the protection requirements and language in the corresponding sections of the RFP based on the results from the PPP analysis of the previous contracted phase.

In this PPP example, the requirement minimizes the access paths to the most critical functions to reduce the possible ways of attacking these functions: The system shall use a least privilege implementation with distrustful decomposition (privilege reduction) or a similar approach, to move Level I critical functions into separate, mutually untrusting programs.

Table 3. Program Protection Key Roles and Responsibilities

Role	Responsibilities
Program Manager	• Manages program protection risks. • Resources program protection efforts. • Initiates program protection efforts early and/or iteratively throughout life cycle. • Incorporates program protection sufficiently into solicitations and contracts. • Considers international acquisition and exportabiliity early.
Systems Engineer	• Ensures development/delivery of capability (cost, schedule, performance and risk). • Conducts trade-off analyses/integrates each engineering specialty and design consideration. • Synthesizes and balances the requirements of all security specialties. • Integrates program protection/system security engineer into systems engineering processes. • Conducts trade-off analyses with respect to system security and other design considerations. • Incorporates system security requirements into the system performance specification.
Systems Security Engineer	• Integrates contributions from security engineering disciplines and security specialties. • Leads evaluation and balancing of security contributions to produce a coherent security capability across program. • Leads program protection analyses for program and system information, Critical Program Information and Trusted System Networks. • Collaborates with security engineering and security specialists to assess vulnerabilities and identify protection measures. • Translates protection measures into system security requirements and adjusts, based on constraints and decisions relayed from systems engineer.

> **Conducting a roundtable discussion and deciding by committee what is critical in just a few hours is not the best course of action if it concludes the program's criticality analysis effort.**

In the following SOW PPP example, the statement requires the contractor to develop software to meet security standards: The contractor shall develop secure design and coding standards and inspect the developed software through static analysis and design and code reviews to ensure that the developed software conforms to these standards.

Q. What is a lesson learned from developing the PPP document?

A. Obviously, this document covers a lot of detail as the overarching security plan for the entire program. The most successful PPP approach occurs when the PMO partners with Industry to develop the PPP and Program Protection Implementation Plan (PPIP). This partnership creates a winning combination as this approach acknowledges the strengths of both entities: Industry's product understanding and the government's ultimate desire to field a good, protected product to warfighters.

Q. What are some other lessons learned regarding security requirements?

A. In the standard acquisition process, a program's Request for Information (RFI) should state the vendor's need to address program protection requirements. One example of an often overlooked area during the early stages of the acquisition process is AT. The purpose of AT design is to ensure that our adversaries do not obtain CPI from our weapon systems or networks. For example, if an aircraft crashed in enemy territory, any CPI on that aircraft would be destroyed and unable to be recovered. The RFI can be used to let the prospective vendors know that AT will be critical, and they should be aware of DoD's AT policy. The AT

engineers at the Service component offices can identify shortcomings early on to avoid cost and schedule issues if afforded an early opportunity to influence AT design.

Q. What are the challenges in developing an effective PPP?

A. The Number One challenge is to get started and acknowledge that there are no short cuts to developing meaningful PPPs. Although each system is unique and has its own requirements, capabilities, functions and components, a very effective tool for all programs is the template provided in the DASD(SE) PPP Outline and Guidance. Using all parts of the template enables developers to meet draft requirements, and programs that have sufficiently responded to the basic outline can delve deeper and ask what makes their program unique and what specific parts of the program need protection.

Another challenge is that PMOs get stuck on the Trusted Systems and Networks (TSN) Analysis, more specifically while conducting the criticality analysis. According to the TSN Analysis document of July 2014, this analysis "consists of several activities: a criticality analysis to determine the most critical functions of the system, a threat assessment to understand the likely attacks, a vulnerability assessment to recognize vulnerabilities in the design and the commercial off-the-shelf products, a risk assessment, and selection of security countermeasures (risk mitigations) based on a cost-benefit trade-off analysis." Figure 1 shows the general sequence of events included in the TSN analysis methodology.

Conducting a roundtable discussion and deciding by committee what is critical in just a few hours is not the best course of action if it concludes the program's criticality analysis effort. The best results come from many hours of objective application of science and engineering principles by the systems engineer and SSE documenting that analysis in worksheets, and then sharing this with the PPP IPT so that any necessary changes are made. Table 4 is a sample worksheet used to

Figure 1. Trusted System and Networks Analysis Methodology
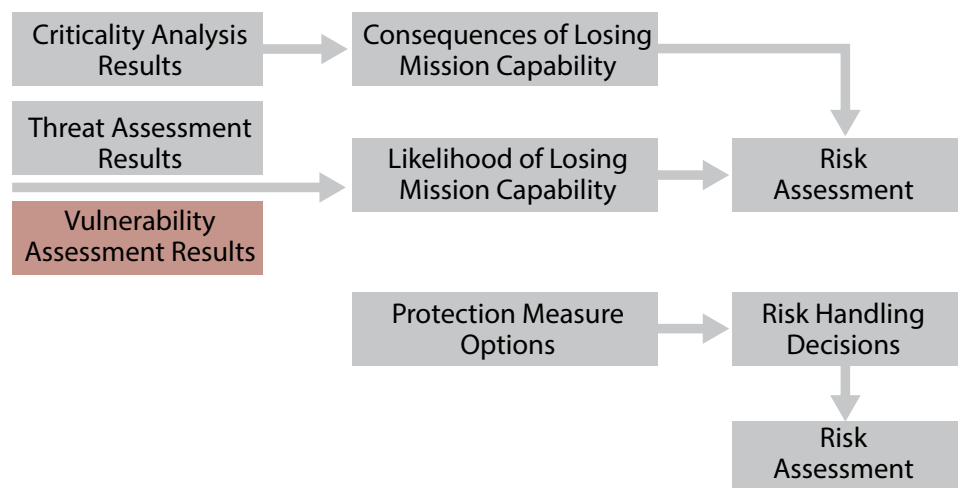
document the system's high-level mission tasks, supporting critical functions, and the components required to make the critical functions operate.

Table 5 is a sample worksheet used to record the analysis of the critical components, including their impact on the system, the assigned criticality level, and the rationale for the identified criticality level.

Q. What tools would you recommend be used in developing an effective PPP?

A. Other useful tools are available in addition to the PPP Outline and Guidance mentioned earlier. A good source of information is the Office of DASD(SE) Initiatives, Program Protection and System Security Engineering website. This site provides numerous resources, such as *TSN Analysis, Engineering for System Assurance,* and *Defense Acquisition Guidebook,* Chapter 9, Program Protection. Additionally, an online DAU course, Program Protection Planning Awareness (ACQ 160), is highly recommended for all IPT members and PMs.

Conclusion

The DoD-established program protection methods, processes and tools have proven useful in developing effective PPPs. The deliberate approach in identifying vulnerabilities and risks provides opportunities for thoughtful consideration and insight necessary for PMOs to analyze which program elements require additional protective measures. A few PMs have recognized the positive attributes of early program protection planning by proactively investing resources into the PPP development, and ensuring mechanisms were in place to best protect their program information.

Network Enablers of the U.S. Army's Program Executive Office Command Control Communications Tactical, have even directed PPP development for their non-program of record product lines. The Product Manager Waveforms Office from PM Tactical Radios is another organization that has embraced this process for all product lines.

These offices may not be required to do everything involved but are keenly aware to the merits of the program protection process. Knowledge and appreciation of the PPP requirements vary across programs. However, one constant many organizations share is the lack of knowledge base, SSEs and proper funding levels to develop the program's PPP via the Program Objective Memorandum process. As the overarching security plan for acquisition programs, PPPs should be the program's most wide-ranging security document. A program's successful execution of these procedures depends upon the integration of system security engineering into systems engineering. The PM's recognition of the SSE specialty and assignment of the right people with the right skill-sets and experiences to key program-protection roles demonstrate program prioritization. PPP development success also is influenced by a knowledgeable workforce that is familiar with PPP basics and that contributes to the PPP's iterative process.

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Table 4. Criticality Analysis Worksheet 1

JCA or High-Level Mission Tasks				Critical Functions	Supporting Logic-Bearing Components		
Conduct Actions on an Objective	Conduct Link-up Operations	Conduct Medical Evacuation	Call for Fire		Hardware	System Software	Third-Party Software Components
X	X	X	X	Establish secure data communications	Crypto PWB Digital PWB	Crypto Software OE Software	RTOS

JCA=Joint Capability Area; OE=operating environment; PWB=printed wiring board; RTOS=real-time operation system.

Table 5. Criticality Analysis Worksheet 2

Critical Component	Systems Impact	COTS/GOTS/OSS/Developmental Item	Legacy/Program-Specific	Criticality Level	Rationale
Digital PWB Part ### ### ###	RAM for the General Purpose Processor	COTS	Legacy	Level I	Radio will not boot

COTS=commercial off the shelf; GOTS=government off the shelf; OSS=open source software; PWB=printed wiring board; RAM=random access memory.

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The Value of Data Visualization

Robert D. Frum, DCS

D oes information visualization provide sufficient return on investment (ROI)? Let us examine the investment value—the estimated financial worth—of providing end-user data visualization. For an organization desiring to depict complex or large data sets in various pictorial or graphical formats for 10,000 users, a commercial visualization product subscription model in which each seat license may cost $50 per month equates to $600,000 per year—not including the labor fee to prepare, implement and maintain the tool.

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Consuming the information on a proliferating number of endpoint mobile devices could further increase costs to more than $1 million, a nontrivial amount in any organization's budget. The potential outlays escalate when spanned across the federal enterprise.

Data visualization value, whether expressed directly from straightforward monetized return or subjectively derived from intangible benefits, needs to be assessed quantitatively to determine the economic return. This would permit a comparison with expected losses and gains from other organizational investments. Without an operationally relevant ROI performance metric, any project expense could be justified to counterweigh the risk of loss.

Extracting value from data typically focuses on the larger and more expensive issues of management and use of big data, where it is assumed that information visualization is a derived byproduct. Yet when tallied as a separate line of investment, the intended scope of graphically depicted data may not provide enough justification for the production cost and potential difficulties. Consequently, as with any significant investment, the chief information officer and the chief financial officer should conduct a timely review of the data-visualization business case for a quantifiable performance measure of success or failure. For example, a good ROI likely would not involve spending more than $1 million on data visualization to save $200,000.

Investments in data visualization must compete with other organizational priorities. Determining the ROI is a challenging exercise because it requires that the organization quantifiably measure not only the quality of the tool's functional

Douglas Hubbard's Rule of Five (*How to Measure Anything: Finding the Intangibles in Business*, published by John Wiley & Sons, Inc., 2010 and 2014). This was applied in the investment risk simulation example in my article, "How to Improve Communication of Information Technology Investments Risks," in the November–December 2017 issue of *Defense AT&L* magazine. Subject-matter expert (SME) knowledge, supplemented with historical and industry statistics, may be a reliable source for accurate numerical value metrics.

Most organizations produce or consume data for leadership to monitor performance and answer such basic questions as: "Are we accomplishing our objectives . . . Are we using our resources in the most effective manner . . . Are we learning ways to improve our performance?" Some outcomes are relatively straightforward, such as "certifying compliance within a numeric benchmark for system defects that either did or did not decline over time." For example, the Internal Revenue Service investment in the Return Review Program (RRP) fraud detection system—replacing the Electronic Fraud Detection System that dated from 1994—either does or does not help prevent, detect and resolve criminal and civil noncompliance. A successful system should result in greater success with more revenue returned to the U.S. Treasury to offset the RRP cost.

But it is more difficult to pinpoint how the data results would reduce risk or improve organizational performance in essential planning, organizing, directing and controlling operations—i.e., identifying the specific business decision problem, the root issue, and how the data visualization investment would help. The answer would then define the metric created to evaluate visualization product cost

When tallied as a separate line of investment, the intended scope of graphically depicted data may not provide enough justification for the production cost and potential difficulties.

characteristics (whether it is accessible, accurate and well designed) but also utilization of the produced information—what can be achieved with better, data-driven management decisions? Too often investment decisions are made, and ROI is not measured, because it is considered unrealistic to expect a quantified measurement of less tangible benefits. The abstract goal of loosely defined long-term benefits then underpins the business case: greater business and customer insight, faster decision-to-answer time, or faster response to customers and markets. However, reducing uncertainty for intangible investments is possible, as indicated by
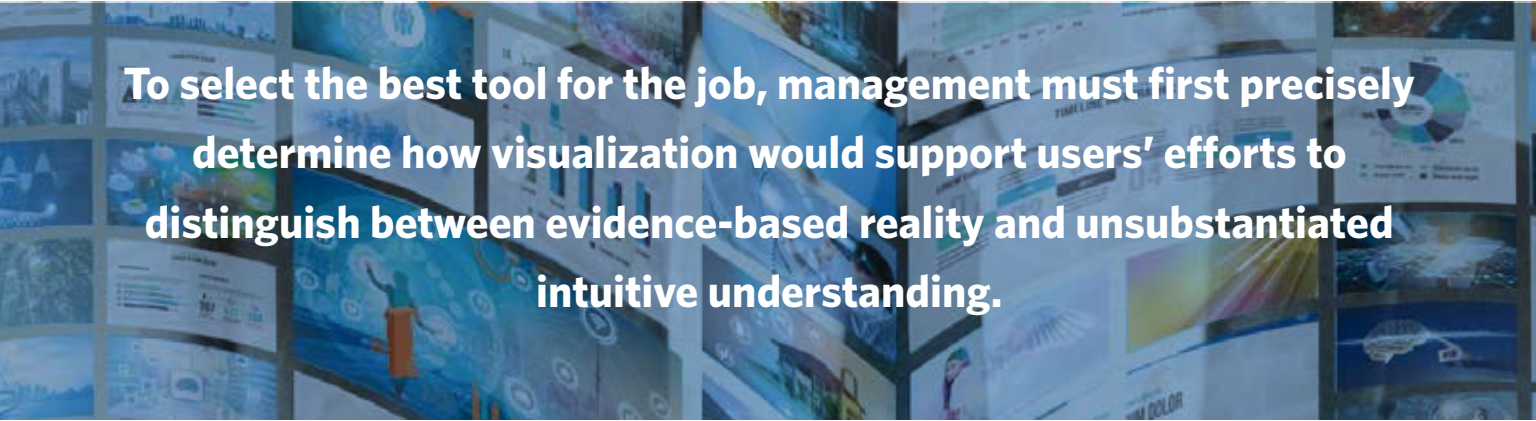
against expected business results: ROI = Investment Gain/Cost of Investment.

To select the best tool for the job, management must first precisely determine how visualization would support users' efforts to distinguish between evidence-based reality and unsubstantiated intuitive understanding. The tool must present raw abstract data in a manner that is meaningful to users for improving understanding, discovery, patterns, measurement, analysis, confirmation, effectiveness, speed, efficiency, productivity, decision making, and

in reducing redundancy. Classic approaches for extracting information from data include descriptive, predictive and prescriptive analytics. The most common is descriptive analysis, used as a lag metric to review what has already occurred. Predictive analysis also uses existing data as

link is 0.02736, then the risk value = ($1.6M x 0.02736) = $43,776. After weighing the organization's cyber defenses and history of cyber attacks, the business-investment decision makers could better determine if investing in employee anti-phishing training and training data visualization is a

> **To select the best tool for the job, management must first precisely determine how visualization would support users' efforts to distinguish between evidence-based reality and unsubstantiated intuitive understanding.**

the basis for a forecast model. Prescriptive builds on predictive analytics, going a step further by offering greater calculated insight into possible outcomes for selected courses of action leading to better decision making. Data visualization of these approaches range from classic bar and pie charts to complex illustrations.

The approach selected must align with the organization's senior leader expectations or else the experiment will be short lived. The organization may already possess visualization tools that can be leveraged at little or no additional cost. If the organization is just getting started, a proof of concept pilot approach may be best, initiating a seminal demonstration that can be progressively refined until an effective management tool emerges. The beginning point could be basic metrics to more accurately measure and assess success associated with the organizational goals, objectives and performance plan. Basic example performance measurement of services, products and processes includes:

- Cost Benefit = (program cost avoided or cost incurred) / (total program cost)
- Productivity = (number of units processed by an employee) / (total employee hours)
- Training Effectiveness = (number of phishing email clicked) / (total phishing attempts)

Performance metrics enable quantitative analysis of whether the tool investment produces sufficient monetary value, fundamentally a risk decision about business outlays. One common method for quantifying risk is: Annualized Loss Expectancy (ALE) = Single Loss Expectancy (SLE) x Annualized Rate of Occurrence (ARO). For example, if the average cost of a phishing and social engineering attack is $1.6 million (M) for a midsize company and the likelihood of a targeted user clicking on the malicious attachment or

reasonable risk-reduction expenditure. After the visualization tool has been purchased and deployed, the value of the insights revealed by the analytics must at that point be substantiated through organizational actions—i.e., cause and effect linkage leading to input/process/output adjustments. As a means of generating business intelligence, the organization is then able to weigh the tool's value, which should be equal to or greater than the production cost. Generally, a more complex visualization results in higher tool cost. The journey from feasibility determination to requirements refinement and then to operational maturity, should be undertaken with the understanding that the initial investment may not be supported by the magnitude of the early results, but total improvement over time should be greater than total outlay.

In conclusion, managing and mining vast amounts of complex data typically results in the need to view information in ways that are measurably meaningful and actionable to the organization. Added benefits include selective sharing, on-demand viewing and more informed decisions. Information visualization tools range from low cost Microsoft Excel charts to more powerful applications capable of producing relationship and pattern analysis, forecasts, scorecards and performance dashboards from large unstructured data. Organization leaders can then shift from reacting to lag measures towards proactive actions based upon predictive data presentation.

Data visualization has a potentially significant cost that must be balanced against the payback benefits rather than simply bundled into a data management package. Selecting the best tool for the organization should include basic cost-benefit analysis based upon a performance metric of the value of the decisions made from the information provided. &

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Corporate Responsibility Management

10 Hidden Signs of a Responsible Contractor

Eugene A. Razzetti

T he most scrupulously researched and carefully worded request for proposal from the Department of Defense (DoD) is only as good as the contractor that wins the award. And what does DoD really know about the "winner" other than he can repeat our demands as if he created them and produce a raft of resumés for any real or imagined proficiency?

We all understand that DoD contractors must provide DoD with a measurably high-quality product or service, on time and within budget. Good luck with that. But wait—it gets worse. Contractors today also must succeed simultaneously across a spectrum of previously hidden challenges that impact the final product, regardless of whether they should have such an impact. Such previously hidden indicators include community responsibility, employee health, safety, quality of life, and environmental compliance. More than ever, DoD contractors (like the rest of the working world) need to recognize and accept all of the previously invisible responsibilities that involve good citizenship. Fulfilling those responsibilities is neither easy nor automatic, and it will impact the final DoD product. Accordingly, program managers should look for the key indicators discussed below in their initial contractor screenings and throughout the duration of the contract.

Razzetti, *a retired U.S. Navy captain, is a management consultant, auditor, and military analyst. He is the author of five management books, including* The Executive's Guide to Corporate Responsibility Management *and* MVO 8000.

Background

In recent years, even the most overconfident chief executive officers (CEOs) have acknowledged the success of structured management systems like ISO 9000, ISO 14000, and many of the others. In those same recent years, monumental company failures have both underscored the need and created the requirement for CEOs and chief financial officers to satisfy themselves and attest in writing regarding the veracity of their documentation. Reliance on outside auditors, to the exclusion of internal auditing and controls, inevitably leads to disaster.

In 2006, I co-created MVO 8000, an international standard for Corporate Responsibility Management (CRM). It was not the intention to replace the knowledge and skill of an ethical CEO with a cookbook. Rather, it was to provide CEOs with useful tools to run their organizations as sound, even-handed leaders, managers and neighbors.

I have written for *Defense AT&L* magazine about "Synergy and Innovation," "Due Diligence," "Tabletop Exercises" and the "Ethical Imperative to Cancel Ineffectual DoD programs." This article supports the others and describes essential indicators of CRM—a management methodology that is (sadly) not yet assessed in the proposal process.

Discussion

Ethical Literacy ➔ Sense of Obligation ➔ Formal Standards

Here are 10 "concealed" but measurable indicators of contractor readiness and potential performance.

1 Corporate Ethics and Organizational Character

Corporate ethics concerns systemic reflection on the rules and issues of how people act. A robust corporate ethics or CRM program institutionalizes ethical rules and practices in the conduct of a corporation's business. For our purposes, CRM is the creation and control of processes to ensure that DoD contractors perform to established standards of ethical practice.

Unlike the more familiar structured management approaches, CRM works with an organization's character rather than that

of its product in order to establish and continually enhance the total organization and how it does business. Specifically, the organization's ability to:

- Create a corporate culture that promotes ethical conduct and makes it a way of life.
- Make a promise and keep it.
- Pledge to a compliance requirement and meet it.
- Be open and honest in all its dealings, with no trade-offs or cut corners.
- Show the greatest possible respect to employees and customers.
- Take seriously its responsibility to the community—however large or small.
- Practice environmental husbandry and conservation.
- Practice responsible risk management and measurably define acceptable risk.
- Develop meaningful metrics and performance indicators.
- Bullet-proof customer relationships with a solid reputation.
- Effectively self-audit and not rely on outsiders.

Apply this organizational character to the future in both strategic planning and the selection and development of its next generation of leadership.

2 An Organized CRM System
CRM policy development should:

- Clearly state management's commitment to high standards of ethical practice.
- Be consistent with management's vision and strategies for the future.
- Permit measurable objectives to be developed.
- Be widely disseminated within the organization and among other stakeholders.
- Document its objectives clearly and be reviewed routinely, and be the object of continual improvement.

A structured CRM System (CRMS) covers relevant ethical aspects of business practice. Customers, suppliers, personnel, investors and other "stakeholders" want to deal with trustworthy organizations that conduct business with integrity. A reputation for trust and integrity is an irreplaceable management asset for recruiting and retaining high-quality personnel. A structured CRMS provides organizations with an agreeable, reliable and ethically responsible working environment, providing the foundation for profitability and longevity. Not only will organizations be improved internally, but communities will be strengthened and enhanced. I see this routinely with my clients in the private sector.

CRMS implementation requires an organization to formulate policies from which relevant procedures and standards are developed. Policy statements then transition into measurable goals and objectives. Feedback mechanisms (such as internal audits and management reviews) keep the system dynamic, flexible and self-correcting.

Formal risk assessments identify and prioritize where actions are required (or may have been ineffective). Relevant metrics monitor and measure interdependencies and evaluate the effectiveness of preventive and corrective actions.

A CRMS is not intended for the enhancement of, or change to, the statutory and regulatory requirements with which organizations must comply, nor is it meant to replace occupational safety and health, or environmental compliance conventions. However, a CRMS, set up within an organization, can reinforce and give great credibility and cohesion to those areas.
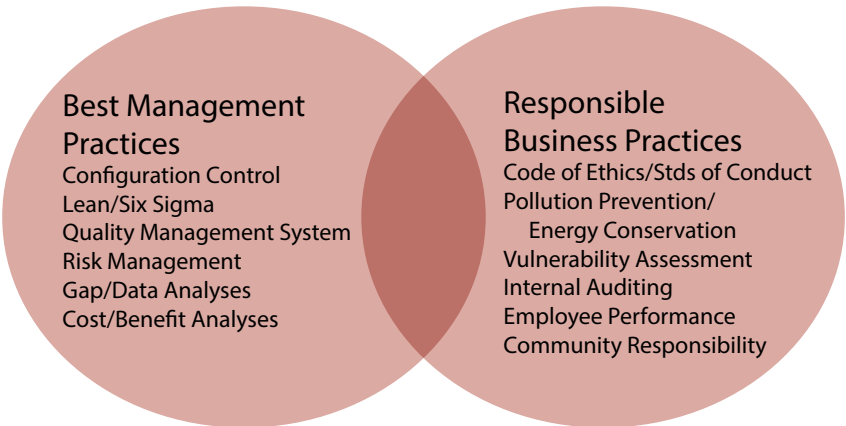
3 Moral Values and Moral Responsibility
For simplicity, we can define moral values as the attaching of priority, importance and allegiance to what is morally good and correct. Having identified and stated our moral values, we need then to impose upon ourselves the responsibility to act in accordance with those moral values—specifically, in how we conduct our business in the community and in the world.

4 Responsible Business Practices
Figure 1 describes the merging of best management and responsible business practices.

Best management practices over the years have generally come to mean what works best for the organization. They can refer to products, services or the indirect operation of the organization. Best management practices, like processes developed under ISO 9000, for example, should be subject to review with thought to continuous improvement through periodic review and revision. Subjecting these practices to cost-benefit analyses, or with thought to the environment

Figure 1. Merging Best Management Practices With Responsible Business Practices

Best Management Practices
Configuration Control
Lean/Six Sigma
Quality Management System
Risk Management
Gap/Data Analyses
Cost/Benefit Analyses

Responsible Business Practices
Code of Ethics/Stds of Conduct
Pollution Prevention/
   Energy Conservation
Vulnerability Assessment
Internal Auditing
Employee Performance
Community Responsibility

Tables and figures by the author.

(e.g., cradle-to-grave supply chain management) will likely cause their periodic revision, even if only slightly.

The objective of Responsible Business Practices is to ensure that companies balance productivity and efficiency with corporate responsibility, environmental attention and community responsibility. DoD should suspend business with unprincipled or corrupt suppliers and/or their subcontractors, including those who fail to maintain a safe and intimidation-free working environment or an effective environmental management program.

Reviewing and reassessing best management practices with thought to CRM will likely result in some revision of those practices to the betterment of the organization and the community, as well as the final DoD product or service.

5 Vulnerability Assessment

Like any of the more conventional subsets of organizational management, corporate responsibility management should be subject to ongoing identification and assessment of vulnerabilities from within and from outside.

Figure 2 provides a generic vulnerability assessment that CEOs or management consultants develop to show a snapshot status or situation. In doing the assessment, we assume that vulnerabilities will always exist and that aggressive CRM programs can decrease their magnitude and "harden" the organization. Accordingly, the goal of vulnerability assessment is to identify areas of low process protection and strengthen them as needed.

6 Converting Gaps into Goals and Objectives— the Strategic Plan

Many excellent books have been written about strategic planning, and many of them are trendy rather than excellent. And many consultants have become rich ruining conference room walls with butcher paper and ink from magic markers. It is not my purpose to repeat or contradict any of them. CEOs decide the best approach— just ensuring that there is a clearly
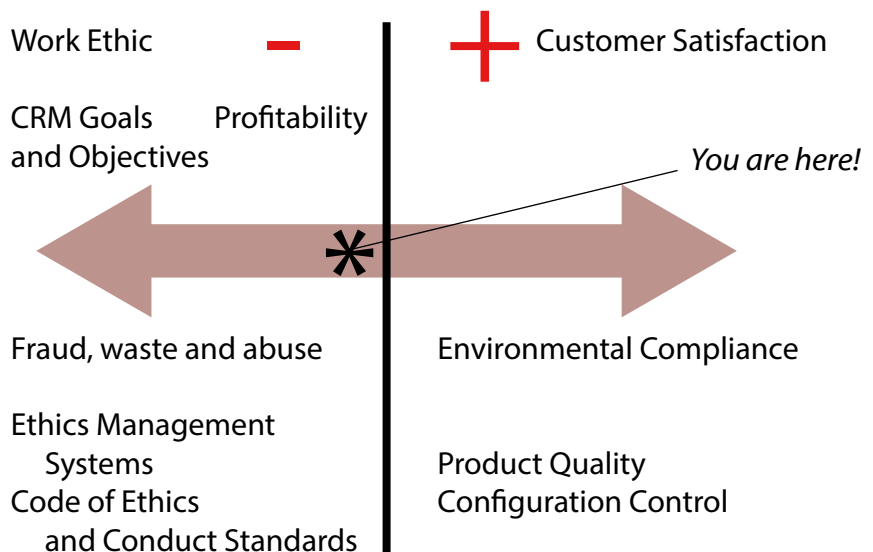
defined mission, a vision of how to accomplish the mission, and with all gaps identified. This requires buy-in at all levels.

An organization's ability to detect, react to and correct shortcomings is one of the best ways to influence stakeholders. Whether you call them internal audits, reviews, controls or (if you've done some time in the military) inspections, these self-imposed forays into how an organization does its business are among the single most important ways to keep organizations safe, legal, profitable and responsible. Internal audits (let's use that term) allow CEOs to find the shortcomings before they become obvious on the outside. They can be as complex or as basic as they need to be. It's only important that they fully address all processes and that the shortcomings uncovered be acted upon. Internal auditors should not audit their own work but should fully understand the subject matter they are reviewing.

7 Doing Things Right

Sound ethical practices and sound economic practices are not mutually exclusive. In the 1990s, many companies found that environmental management, not environmental compliance, lead to better-looking bottom lines as well as better-looking neighborhoods. An organization intent on "doing things right" must make that intention actionable across a

Figure 2. Vulnerability Assessment

Work Ethic   **−**   **+**   Customer Satisfaction

CRM Goals and Objectives   Profitability

You are here!

Fraud, waste and abuse   Environmental Compliance

Ethics Management Systems
Code of Ethics and Conduct Standards   Product Quality Configuration Control

broad spectrum of its activities. Making a profit (as a likely example) means making that profit ethically and responsibly.

Specifications need to be correctly developed and followed; prices correctly determined; cost figures accurate and proper; and milestone inspections being performed and satisfactory, with shortcomings identified.

Personnel training and competence must be appropriate for the tasks, and the environment (if not enhanced) must not be damaged.

To achieve and maintain a reputation for doing things right, contractors must ensure that all of the above considerations (and more) are reflected in delivery of products and services.

Add to this the need to be a good neighbor. These days, many top organizations are mobilizing their forces into measurable performances of citizenship and commitment (e.g., adopt a school, park, team or street).

8 An Ethics Mindset

Day-in, day-out allegiance to CRM starts at the top—by example, and not by fiat. Nothing spells disaster more precisely than when employees see bosses breaking rules that they would break at the cost of their jobs.

Doing things right, as mentioned earlier, requires sensitivity for the ethical issues inherent in an organization or program. Contractors encounter these every day, when dealing with:

* Responsibilities to DoD
* Responsibilities to suppliers
* Employee performance measurement and handling grievances
* Benchmarking ethical performance
* Product and service quality
* Community responsibilities
* Protecting the environment
* Employee recruitment, training, competence certification, health benefits and general quality of life
* Strategy development, marketing and sales campaigns
* Business development
* Development and certification of financial statements and disclosures

Organizations need to develop and publish what they consider to be ethical conduct by employees at all levels. Table 1 is a section from the checklist for a Code of Ethics and Standards of Conduct.

9 Laws, Regulations and the Environment

"To expect no regulation is willful blindness."
—Peter Drucker

We have had a history of manufacturing crises in the United States—unsafe automobile brakes, tires and air bags, air

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Table 1. Code of Ethics and Standards of Conduct (segment)

Has management created a Code of Ethics and Standards of Conduct that includes:

* The Corporate Responsibility Management System
* Statutory and regulatory requirements
* Formal standards of performance and expectations
* The organization's moral values with respect to personnel, customers, competitors, suppliers and society
* Unacceptable ethical behavior as it applies to the organization
* Legal obligations of the organization and its members
* Intellectual property
* Physical and environmental security
* Access control
* Communications and operations management
* Use of company property
* Internet usage
* Timesheet and travel claim preparation
* Working from home
* Internal auditing processes

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and water pollution, improper hazardous waste disposal and squandering of public utilities. This history has been chronicled in terms of deaths, diseases, public scandals, fines, product removals/recalls and company bankruptcies; and also by government investigation, intervention and legislation. When the government gets involved, it is usually after the damage is done and punitive action is the order of the day. It does not have to be that way, and forward-thinking organizations know that.

The public in general and DoD in particular are entitled to expect products to be not only safe but to cause no harm in their creation; and the government has the obligation to enforce and ensure that right.

DoD contractors need to identify their environmental impact(s)—actual and potential, positive and negative. An organization implementing a CRMS and not yet having an Environmental Management System can create both simultaneously. The organization should benchmark its initial situation relative to environmental compliance. It can effectively do so by assessing its environmental compliance status with regard to:

* Hazardous material control and management
* Its activities and processes and their environmental impact
* Applicable statutory and regulatory requirements
* Pollution prevention and energy conservation
* Supplier selection

- Contract development
- Identification and monitoring of environmental aspects

10 *Outreach to the Community*
Contractors should fully define and accept their roles, responsibilities and authorities as members of the community, including:

- Evaluation of the potential impact of all operations on the environment
- Periodic evaluation of the performance of community responsibilities as part of a formal review process, with appropriate feedback mechanisms, and normal and emergency lines of communication
- Execution of environmentally sound policies and objectives
- Development of recommendations for improvement

Summary

At this point, we know that black ink on the bottom line is not enough. There are other considerations and measurements of a DoD contractor. If the elements of an effective CRMS are not there, sooner or later the product suffers.

DoD contractors need to identify all the processes of the potential product or service. Once identified, then understand the inherent risks to the product and the environment. Product performance must be capable of measurement, and the findings actionable. Core values need to be in writing—in the base documents and all supporting documents as well.

DoD contractors need to identify all stakeholders. They certainly include the military end user but also employees, suppliers, shareholders and surrounding communities. Stakeholders may be scattered all over the world, or just downstream of that little creek that flows behind the loading dock. Contractors can communicate through a very sophisticated website or through the storm drains.

Program managers and contractors need to identify all the ethical issues associated with contract performance. Contractors need to recognize their obligation to deliver value and the direct relationship their reputation has with that value. Contractors put their names on their product, whether they realize it or not.

Day-in, day-out allegiance to a CRMS starts at the top—by example, and not by fiat. DoD contractors' responsibilities to their employees and suppliers go beyond writing checks. They have an obligation to be fair and honest with the employees and suppliers, and have a right to expect the same in return.

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Commercial Items

If Only It Were So Easy

Peter Levine

The congressionally chartered Advisory Panel on Streamlining and Codifying Acquisition Regulations (the "Section 809 panel") released its recommendations on commercial buying by the Department of Defense (DoD) earlier this year. The panel's report noted that, despite the simplification of requirements for the purchase of commercial items in the Federal Acquisition Streamlining Act of 1994 (FASA) and the Federal Acquisition Reform Act of 1996 (FARA), "commercial buying has not become as widespread in DoD as Congress had hoped."

The Section 809 panel's objective of removing unnecessary impediments to the acquisition of commercial products and services is as sound today as it was when FASA and FARA were enacted more than 20 years ago. Moreover, the panel makes some interesting and potentially constructive recommendations—including

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the establishment of separate definitions for "commercial products" and "commercial services," the creation of a new category of commercial buying, based on "commercial processes," and a re-examination of government-unique laws and regulations applicable to commercial purchases.

As a principal drafter of the commercial item provisions in FASA, FARA and many of the acquisition laws that came after, I am, however, concerned that the Section 809 panel may have misread the legislative history of key provisions and, consequently, failed to identify some of the competing interests considered by Congress in drafting this legislation. While DoD should be able to meet military needs and protect the taxpayers without creating unreasonable barriers to commercial purchasing, a favorable outcome is unlikely to be achieved by overlooking competing interests and imagining that the problem is an easy one.

Three areas in the Section 809 panel's report raise particular concern: the treatment of commercial, off-the-shelf (COTS) items, commercial items embedded in weapon systems, and contract clauses intended to implement statutory and regulatory requirements:

(1) COTS Items. The definition of COTS items was developed, the Section 809 panel notes, "to provide additional opportunities for the government to buy from the commercial market by providing for additional statutory exemptions for commercial items that satisfied the much narrower COTS definition." In the panel's view, however, "[t]he effect of creating these two classes is that much of the streamlining Congress intended for commercial products is being more narrowly applied to COTS items." The implication is that Congress did not understand its own actions, and had the COTS definition not been written, the same streamlined treatment

provided for the purchase of paper clips would surely have been extended to the purchase of tanker aircraft. On this basis, the panel recommends the repeal of the COTS statute.

This view is historically inaccurate.

The definition of commercial items was adopted when FASA was enacted in 1994. At that time, Congress exempted commercial items from a number of burdensome requirements, but declined to provide relief from others. To keep the list of requirements from growing, Congress authorized the Executive Branch to exempt commercial-item procurements from procurement statutes enacted after the passage of FASA. It was only a year after Congress had determined the scope of the exemptions to be provided to commercial items that a separate provision was enacted to provide additional statutory relief for purchasing COTS items. The statutory streamlining provided for COTS items could not have been "intended for commercial products," since Congress had defined the limits of the commercial product exemptions before the COTS provision was drafted.

The Section 809 panel asserts that the COTS provision is "a mirror image" of the commercial items provision. That is not the case. While the commercial items provision (now codified under *Inclusion in Federal Acquisiton Regulation* [41 U.S. Code (U.S.C.) Section 1906]) authorizes the Executive Branch to grant relief only from statutory provisions enacted after the 1994 enactment of FASA, the COTS provision allows relief from statutory provisions without regard to the date of enactment. This is presumably why the Office of Federal Procurement Policy was able to exempt COTS items, but not commercial items, from the component test of the Buy American Act (which was first enacted in 1933).

Similarly, the statutory prohibition on purchasing specialty metals from other-than-American sources was first codified in 2006 without any exemption for either commercial items or COTS. It was only a year after the decision was made not to provide relief for any commercial items that Congress revisited the issue and added an exemption for COTS items. This was a hard-fought issue in conference between the House and Senate Armed Services Committees, and it is fanciful to believe that in the absence of a COTS exemption, a full commercial item exemption would have been adopted.

The power of the COTS provision has never been fully used by the Executive Branch. No comprehensive review has ever been conducted to determine whether COTS items should be exempted from pre-1994 statutory requirements, and the Buy American Act appears to be the only such statute for which the authority has been used. As long as the authority remains on the books, however, it could be used by a future administration to further streamline the purchase of COTS items by exempting them from procurement statutes without regard to when they were enacted. The repeal of the COTS provision would eliminate this powerful waiver authority, while leaving the narrower commercial items waiver authority unchanged.

(2) Commercial Items Embedded in Weapon Systems. The Section 809 panel recommends the harmonization of a wide array of statutory provisions to incorporate the commercial item definitions adopted in FASA and FARA uniformly. I leave it to others to assess the impact of the panel's proposal to modify the definition of commercial items used in the statutory provision on Core Logistics Support (10 U.S.C. Section 2464) on the balance between public and private sector depot maintenance work. However, the panel's discussion of a provision addressing the validation of rights in technical data appears to miss the purpose of the provision.

The statutory language addressing the validation of technical data rights for major weapon systems (*Validation of Proprietary Data Restrictions, Claims,* 10 U.S.C. Section 2321[h]), the Section 809 panel report states, "is actually a blending of the existing COTS definition ... and the commercial item definition ... with several key elements of the commercial item definition left out." "It is problematic," the panel said, "to have a unique definition of commercial product solely for the purpose of protecting proprietary data that is inconsistent with the standard definition of the term used throughout the U.S.C. and the FAR (Federal Acquisition Regulation)." Moreover, the panel said that it was unable to identify any rationale for the how the provision is cobbled together. "The legislative history," the panel reported, "provides no rationale for this unique definition."

The definition of commercial items is a red herring, however, because Section 2321 does not modify that definition. Rather, Congress recognized that some commercial

> **...The panel said that it was unable to identify any rationale for the way in which the provision is cobbled together. "The legislative history," the panel reported, "provides no rationale for this unique definition."**

items might be developed with public funds, and wanted to protect thegovernment's data rights in such cases. The issue was not whether these items were commercial but how to determine who paid for the development.

Section 2321(h) was initially enacted in the commercial items title of FASA, and was written to ensure that purchases of commercial items (as defined in the same title) would not be burdened by the inappropriate application of technical data requirements. The provision did not take the form of a full exemption, the conference report indicated, because "[t]he conferees were concerned that a blanket waiver from these statutes could prevent the federal government from obtaining technical data rights on items developed with public funds." For this reason, FASA precluded the government from seeking technical data on commercial items "unless the government can prove that an item was developed at government expense."

This provision worked as intended for most commercial items. Over time, however, the DoD began to find that it lacked sufficient technical data to provide for competition in the sustainment of major weapon systems developed primarily or exclusively at government expense. One factor was the insistence of some contractors that the military-unique spare parts they sold to the DoD were commercial items. This issue came to a head with a 2006 DoD Inspector General report finding that a major DoD contractor had insisted that every spare part it sold to the DoD was "of a type" sold to the general public. Most of the parts in question were specialized gear boxes, hydraulic motors, fuel controls, and similar components of the F-16, the B1B, and other military-unique aircraft that were developed pursuant to DoD contracts.

Congress responded to this problem by amending Section 2321(h) in 2007. The amendment did not modify the definition of commercial items, and it did not alter the rule that contractors retain the rights to technical data in items that are developed exclusively at private expense. Rather, it provided that in the case of items embedded in major weapon systems, the burden would be on the contractor, not the government, to prove that the items were developed at private expense, regardless of whether the contractor argued that they qualified as commercial items. This shift of burden was deemed appropriate, because the contractor, not the government, was likely to have the best access to information regarding what government or nongovernment money was spent on developing a particular item. As the conference report explained, the intent was to balance the DoD's need for data rights needed to maintain major weapon systems with contractors' right to withhold data on items developed exclusively at private expense.

Section 2321(h) was further modified over time, so that the presumption now favors the contractor in cases where the item at issue is a COTS item, a component of a commercial subsystem (like a commercial engine), or a component of a weapon system that was developed on a commercial basis. However, the provision's basic purpose remains unchanged: the need to balance between two competing interests in a case where a product with some commercial characteristics and some military-unique characteristics is incorporated into a major weapon system. Congress may choose to change the balance again and restore the presumption that all commercial items are developed at private expense, but it should not do so in ignorance of the impact that such a change would have on the government's ability to sustain military-unique weapon systems.

(3) The Application of Statutory and Regulatory Requirements. The Section 809 panel reported that the number of government-unique contract clauses that may be applicable to commercial-item and COTS contracts continues to expand, despite provisions in FASA and FARA intended to limit such growth. In 1995, the panel reports, there were 57 provisions and clauses in the FAR and the Defense Federal Acquisition Regulation Supplement (DFARS) that were applicable to commercial items. Today, the number is 165.

The reason for this growth, in the Section 809 panel's view, is that the Executive Branch has overused its flexibility to determine that it is in the best interest of the government to impose a requirement on commercial items contracts. The panel report states:

> DoD has frequently used its authority, with or without a formal written determination, to impose conditions on commercial and COTS contracts other than those mandated by Congress. The overuse of this flexibility has undermined the expansion of DoD access to the commercial marketplace and contradicts congressional intent to support implementation of commercial policies within DoD.

Accordingly, the panel recommended that the statute be amended to: (1) eliminate the flexibility of the Executive Branch to impose statutory terms on commercial contracts; and (2) exempt commercial purchases, even from statutes providing for civil and criminal penalties. Further, the panel recommended that the Executive Branch modify the FAR and the DFARS to make all existing government-unique clauses and conditions inapplicable to commercial contracts, except for the six that are specifically required by statutes that include special language overriding the requirements of FASA and FARA.

There are several problems with the Section 809 panel's recommendations.

First, the panel incorrectly concludes that of the 165 provisions and clauses made applicable to commercial item contracts under the FAR and the DFARS, only the six provisions containing special language were mandated by Congress. In fact, a substantial number of the provisions recommended by the panel for removal from the FAR and DFARS were mandated by statutes that preceded the 1994 enactment of FASA.

Congress reviewed these statutes when FASA was enacted and determined that they should continue to apply to commercial purchases. Congress may wish to re-examine these requirements, but the Executive Branch does not have the authority to limit the applicability of these statutes to commercial items without further action by Congress.

Second, the Section 809 panel provides no explanation for its recommendation that statutes imposing criminal or civil penalties should no longer apply to the purchase of commercial items. Congress declined to exempt commercial purchases from the application of such statutes out of concern that it might inadvertently excuse commercial contractors from penalties for fraud or other misconduct. Twenty years after the enactment of FASA and FARA, it may be appropriate to consider the impact of the provision and determine whether it is needed to address its original purpose. However, the panel report included no identification or assessment of provisions that may or may not be covered by the provision; instead, it assumed without evidence that whatever the provisions may be, they should not apply to commercial purchases. In the absence of a serious analysis, it is difficult to dismiss the concerns that led to the provision's enactment in the first place.

Finally, the fact that Executive Branch discretion appears to have been overused does not mean that it was misused in every case. For example, the Section 809 Panel questions the Executive Branch decision to apply statutory provisions designed to combat human trafficking to commercial purchases. "It is unclear," the panel says, "why a contractor selling supplies that meet the narrow definition of a COTS product should be exempt from the requirement to prepare and maintain a compliance plan, yet a contractor selling similar supplies that differ only in that they are not sold in substantial quantities should not also be exempt."

The Section 809 panel appears to have overlooked the fact that the statutory requirement for a human trafficking compliance plan applies to contracts for "services required to be performed … outside the United States," excluding the vast majority of commercial items, which are purchased domestically. The provision was applied to commercial items because—at least under current law—the term "commercial items" includes services as well as products. Public concern about human trafficking on defense contracts was first aroused by allegations that some contractors brought third-country nationals to Iraq on the basis of false representations and then took away their passports, in effect forcing them to remain and work against their will. The services provided by third-country nationals in Iraq included construction work, cafeteria work, maintenance and repair work, and other activities that could meet the definition of commercial services.

Under these circumstances, the DoD decision to apply the human trafficking provision to commercial contracts to be performed outside the United States was not unreasonable. A similar case could be made for the DoD decision to apply

several other statutory requirements that are designed to protect United States interests in the world. These include provisions governing the conduct of contractors performing private security functions outside the United States, prohibiting the acquisition of commercial satellite services from foreign entities that might use their position to interfere with U.S. operations or collect intelligence against the United States, and authorizing the DoD to take action against foreign sources who could use their position in the supply chain for espionage or sabotage of military systems.

Concluding Thoughts

As tempting as it may be to remove all Executive Branch discretion in cases where it appears to have been overused, one-size-fits-all solutions tend to be problematic, and the elimination of flexibility can have adverse consequences. The members of the Section 809 panel are all experienced acquisition professionals for whom I have the greatest respect. They had a sound objective of streamlining the DoD acquisition system to make it easier for the DoD to access commercial companies and commercial technologies. Nonetheless, I cannot help but believe that their report would have been stronger had they been better informed on the history and purposes of the legislation that they recommend revising.

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Agile—the Pros and Cons

John M. Nicholson

here is a movement within the Department of Defense (DoD) acquisitions community to become more "Agile" and to field capability more quickly. Achieving this goal requires that the defense acquisition community become more risk tolerant.

Currently, there is a disconnect between the leadership of the DoD and the rest of the acquisition community. That is, DoD acquisition leadership desires to field capabilities more quickly and with more agility, but the middle ranks of the acquisition community seem resistant to the Agile paradigm shift. This disconnect creates a dangerous path to travel for those in the DoD acquisition community trying to plan and execute projects in a more streamlined and agile framework.

But what causes this disconnect? Let's explore some observations from the perspective of a project lead engineer working on a U.S. Air Force (USAF) sustainment contract for Air Force Space Command (AFSPC) on several Agile projects. The project experience is drawn from software-centric, 1- to 2-year efforts involving 10 to 20 technical staff members—the ideal project category for a mainstream Agile methodology.

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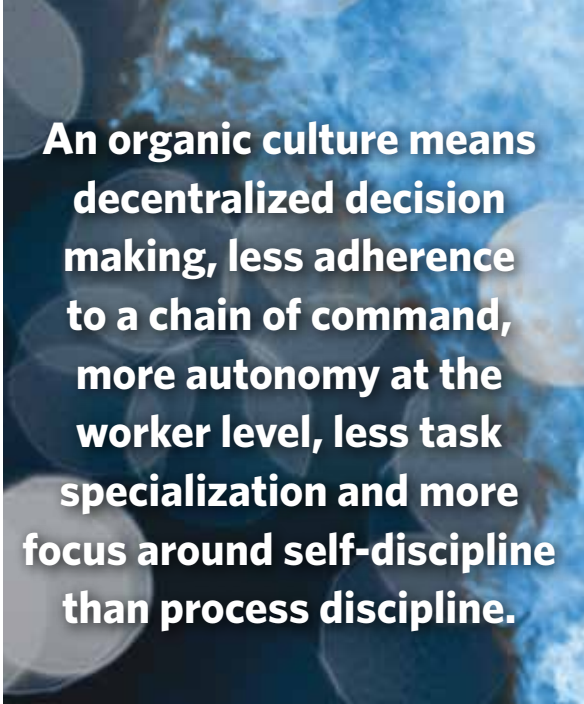
Why Go Agile?

The Agile methodology offers numerous advantages over the traditional "waterfall" approach to development. The primary weakness of the traditional approach to development is the assumption that, after the requirements are specified and the project is planned, nothing will change. The traditional development process has no inherent mechanism for dealing with uncertainty. Even worse, the project requirements, schedule and budget are all cemented in place when we know the very least—at the beginning of the project or before it begins—and there is no effective mechanism for accommodating these inevitable changes.

An organic culture means decentralized decision making, less adherence to a chain of command, more autonomy at the worker level, less task specialization and more focus around self-discipline than process discipline.

documentation de-emphasize the self-discipline required for engineering development. That is, one side describes discipline as "process discipline" and the other side describes discipline as "self-discipline." In reality, both are needed for effective engineering development. Agile methodologies are not absent of process and process discipline, they just use a different approach. Reviews, for example, are conducted on Agile projects, they are just pushed lower in the organization and are accomplished more organically. In fact, many Agile practitioners are process zealots and are fanatical (including the author) about the processes used on their project.

One way to deal with the inevitable uncertainty and change associated with engineering development is to embrace the change. That is, to admit that change is inevitable and to structure the development methodology and framework to and team to accommodate those changes. This is what Agile development does that traditional processes do not. Agile methods acknowledge that requirements will change and timelines and budgets often shrink. The Agile methodology is structured to accommodate these changes by having the flexibility to modify scope to meet these changes. This allows the Agile project to field capability—possibly less capability than initially expected—despite changes to the requirements, cost or schedule. It usually is preferred to deliver partial capability after a financial investment rather than the "all-or-nothing" approach in the traditional process.

Two Definitions of Discipline

Interestingly, the major strengths of Agile are also among the reasons that it meets resistance in the acquisition community. Often, acquisition managers are not trained on Agile methods and are not comfortable with ambiguity associated with potentially frequent scope changes. To compound the problem, Agile often de-emphasizes formal verification, endless planning, comprehensive documentation and formal processes. That is, Agile methods de-emphasize aspects of the traditional process that the traditional DoD acquisition approach was built around. This change in emphasis is often interpreted and critiqued as having a lack of discipline. This concept of "discipline" has been a major focal point in the debate between so-called Agilists and traditionalists.

However, this disagreement is somewhat of a miscommunication. Traditionalists believe that the lack of formal methods and process adherence is a fatal flaw in the Agile methodology. On the other hand, Agilists believe that formal processes and

Organizational Limitations

There are two aspects of the organization that cause disconnects between the DoD acquisition leadership and the people in the program offices that execute defense acquisition work. The first cause for this disconnect is so-called "organizational inertia." In other words, the organization resists change. One reason for this is that the processes and guidance that exist within the organization are built around the current way of doing business. For example, current organizational guidance has specific instructions for performing System Requirements Review (SRR) and then controlling the requirements baseline after through a disciplined change control process. This process is deliberately established to prevent the sort of scope flexibility that Agile methodologies strive to achieve. In some ways, Agile methods contradict the existing way of doing business. Advocates of the existing approach therefore have precedence over the advocates for process change—it's too radical in some ways. It's also a bad idea in some cases. However, the existing DoD framework is inflexible and does not condone the concept of Agile.

The second organizational cause of disconnects between DoD acquisition leadership and their program office staff is the organizational structure of many of these organizations. The paperwork-based, process-oriented, traditional waterfall model of engineering development fits nicely into bureaucracies. Bureaucratic organizational cultures notoriously lack innovation and are often at the other end of the culture spectrum of team-oriented, organic organizations that most Agilists operate within. These organic cultures are somewhat foreign to the DoD. Organic culture does not mean wearing flip-flops, playing ping-pong and bringing your dog to work. An organic culture means decentralized decision making, less adherence to a chain of command, more autonomy at the worker level, less task specialization and more focus around self-discipline than process discipline.

The DoD has been in the acquisition business a long time—the acquisition workforce has organized itself in a specific way, establishing process and guidance around the traditional waterfall engineering model and creating an organizational culture that working as a whole creates a formidable amount of friction in implementing Agile processes. Perhaps the most difficult obstacle is the radically different organizational culture established in most Agile commercial organizations and the DoD. For example, adherence to the chain of command is accepted without question in the DoD. Two side effects of the existing DoD culture that stifle the adoption of Agile methods—and innovation in general—are that the punishment for failure outweighs the reward for success in many of our organizations and that this results in a severe aversion to taking risks.

Striving Toward Predictability

Most bureaucracies, including the DoD acquisition community, have established a culture that strives for predictability. Bureaucracies endeavor to improve efficiency and optimize the steady-state. This goal for efficiency and predictability is a reason why the waterfall model is so appealing. The waterfall model fixes the scope, baselines a project plan and then executes as closely as possible to that plan. Indeed, this process discipline often leads to better cost and schedule control on a project.

However, this never-ending quest for efficiency comes at a price—well several prices, actually. First, improving costs and schedule control is accomplished by slavishly following a plan and predetermined scope. Often, requirements change because the project team misunderstood the user needs in the beginning and/or the user changed its mind as the project progressed or the operational environment changed during the project. Regardless of that, the requirements very often changed for a good reason. Therefore, failing to change them degrades the quality or usefulness of the product being developed. Agile methods are one approach to deal with these inevitable changes.

Perhaps more important, the drive for efficiency hampers innovation. That is, innovation involves taking calculated risks. We must try new things in order to innovate. Trying new things requires the possibility of failing. Optimizing the steady-state, by definition, discourages change. Change is not predictable. Therefore, optimization of the steady-state increases competitiveness over the short term at the expense of innovation. Over the long term, organizations driven by efficiency increasingly become obsolete by failing to evolve due to lack of innovation.

Striving to maximize efficiency puts the emphasis on predictability rather than innovation. In this organizational culture, little value is placed on innovation. In some ways, it is more desirable to fail predictably then to succeed unpredictably. Bureaucratic organizations often punish failure more than they reward success. Therefore, in order to innovate, one must take great personal risk to their professional reputation and credibility within their organization.

Contracting Constraints

Regardless of how innovative program offices become, they will be limited by the rules under the Federal Acquisition Regulation. No matter how innovative and Agile organizations become, they will still be bound to execute to contracts that include a statement of work with a fixed scope that the contractor is required to meet—a scope that cannot be easily modified. This also is intended to drive predictability into the process. However, it can serve to stifle project Agility by limiting the flexibility of programs to execute projects.

If the DoD desires to become more innovative and Agile in its methods, the programs' contracting rules need to be updated. Contracting mechanisms and incentives should examined with a view of maximizing capabilities delivered to the warfighter rather than maximizing predictability in the acquisition process. This is what it means to be truly Agile.

Conclusion

Many DoD acquisition leaders call for their programs to become more Agile and innovative. They want to deliver capabilities to the warfighters more quickly and cheaply. They wish to take more risk and are willing to accept less-than-perfect solutions. This allows more rapid feedback and provides opportunities to improve through incremental capability enhancements.

To achieve this goal, however, leaders must be willing to take action beyond proclaiming "we are going to adopt Agile." Leaders must be willing to look deeper. They must be willing consider their definition of discipline and evaluate their processes and regulations and be willing to change their organizational structure and help their staffs overcome inertia built into the DoD acquisition system. Leaders must be willing to take a hard look at the organizational culture established in the program offices they lead and decide if they provide employees with enough incentives to innovate. Do they seek to optimize the steady state or to innovate and push the envelope? Are they willing to take more risks? Are they willing to look at the contracting process and be innovative regarding how contractors are incentivized to maximize capability to the warfighter?

In order to become truly Agile, we must seek to encourage organizational change and incentivize those early adopters and project innovators to evolve the DoD acquisition process without having to put their own careers on the line. This involves accepting greater risk and the possibility of failure. Agile methods are not for the faint of heart; they involve ambiguity and uncertainty and are not predictable. They are often less efficient. But they often are faster and more effective than traditional processes. They often provide great value for those who are willing to embrace the culture change and seek innovation over predictability. Making the Agile movement more than just a fad in defense acquisitions is the required culture shift. The question is: Can we take the leap? &

Contracting and Acquisition
# DURING WORLD WAR I

Leo P. Hirrel, Ph.D.

World War I marked the transition of the United States Army from military insignificance into a premier fighting force. Much has been written about the immense changes within the Army's operational side; yet the lessons learned regarding contracting and acquisition were equally important. Any global power requires the institutional culture to translate industrial resources into munitions, services and the other means of waging war. In reviewing the war's centennial anniversary, it is useful to consider its contracting and acquisition side. This article has been derived from my book *Supporting the Doughboys: US Army Logistics and Personnel During World War I* (Fort Leavenworth: Combat Studies Institute 2017).

Success in acquisition came slowly and was plagued by delays and confusion; early mistakes had implications that lasted beyond the Armistice. The nation simply did not have the bureaucratic culture, or flexibility, to obtain the instruments of war. The story of contracting and acquisition for World War I is one of remarkable achievements to solve problems that might have been mitigated or avoided altogether by better preparation.

America entered the war with a dysfunctional bureaucracy. Logistical functions, including acquisition, were managed by a collection of semi-autonomous organizations collectively termed the supply bureaus. The Quartermaster Corps,

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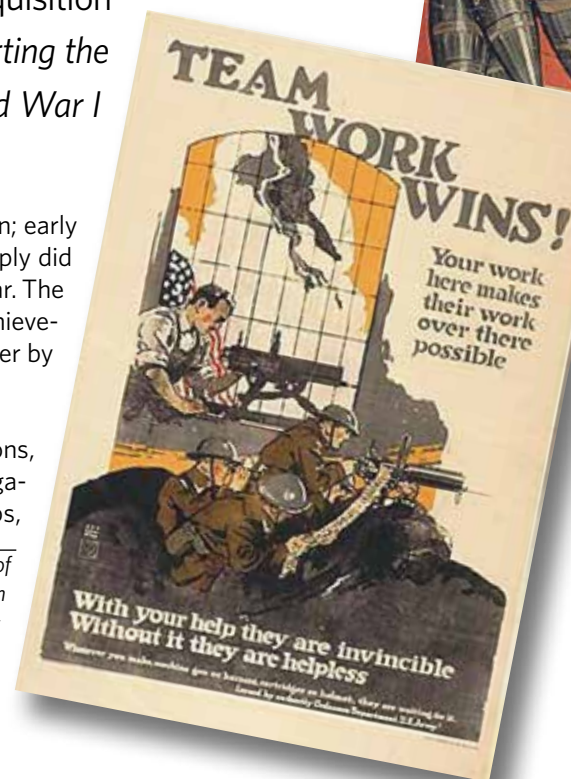
which managed general supplies or services, and the Ordnance Department, which managed weapons systems, were the two most important bureaus; but the Corps of Engineers, Signal Corps, and Medical Department held materiel responsibilities in addition to their operational duties. (During the war, the Air Service and the Chemical Warfare Service became independent agencies, with their own logistical authorities.) Although the system worked well enough in peacetime, it lacked any mechanism for creating a unified wartime effort. Over time, the prewar bureaus developed a culture that valued individual performance over the national effort. They competed for scarce resources, driving up prices in the process. In short, decades of atrophy produced a War Department better suited for peace.

An ordnance production line in World War I.
Photos from the U.S. Army Signal Corps.

Contracts were advertised in advance and awarded on a low bid, fixed price. The success of this system depended upon predictable conditions, when potential contractors were familiar with government requirements, and raw materials were available at predictable prices. The system did not work well in an emergency environment, where the requirements were unpredictable, and contractors had to produce immediately.

Despite these problems, most Americans expected efficient mobilization; and the confusion surrounding industrial mobilization shocked the nation. Lack of planning for installation construction delayed the training program for new soldiers until the onset of winter. Even though the Quartermaster General recognized the potential for a shortage of wool, laws about market speculation prevented the government from acquiring wool while it was available, thus leaving the soldiers without coats and blankets during that extremely cold winter. An insufficient number of shipyards delayed an aggressive ship construction program until nearly the end of the war. Charges of excessive profits by industry compounded the difficulties.

Difficulties with ordnance production best illustrate the results of the decades of neglect. Prior to the war, the Ordnance Department relied upon its network of government arsenals to produce weapons, ammunition and related items. Without government contracts, American industries had no reason to create the jigs, dies and other tools necessary for mass production. In 1915 and 1916, Congress rejected recommendations by the Chief of Ordnance to accept higher prices from industry to prepare for an emergency surge in requirements. When the United States entered the war, American industry could not produce the necessary weapons, forcing the Army

to rely upon France and Britain for artillery, tanks, aircraft and most ammunition. Despite the superiority of the Springfield rifle, American soldiers used the British Enfield rifle because American companies already had British contracts and therefore had the tools for mass production. Efforts to adopt French designs for artillery and other weapons proved unexpectedly tricky because of the difficulties of converting metric specifications and the French methods of looser tolerances with final adjustments made by the mechanics.

By December 1917, problems with production and transportation reached a crisis level leading to significant government reorganization. Although President Woodrow Wilson had statutory powers to allocate resources, he preferred to rely upon voluntary cooperation from industry and the various government agencies. Unsurprisingly, both government bureaus and war industries competed against each other for scarce resources. The resulting chaos threatened to cripple the national mobilization. Consequently, Wilson asserted more authority by seizing control over the railroads; and initiating government reorganizations. Bernard Baruch's appointment to the War Industries Board signaled a more aggressive management of priorities.

Despite the late start, American industry, working in conjunction with the Army and Navy, made some impressive accomplishments, often with groundbreaking techniques. Shipyards developed mass production techniques so that a single shipyard at Hog Island, Pennsylvania, launched more ships in October 1918 than the entire United States did in 1916. New arrangements for government-owned, contractor-operated ammunition factories were just starting to produce impressive

numbers by the end of the war. Some innovations included standardized construction procedures at new shipyards, or coating cotton fabric for aircraft to replace scarce linens. By autumn 1918, the United States was showing indications of the munitions juggernaut it would become in later decades.

In Europe, contracting and acquisition became a vital component of the logistical support to the American Expeditionary Forces (AEF). Given the constant shortages of cargo ships, the United States relied heavily upon local goods and labor to supplement the support available from home. In addition, the United States relied upon France and Britain to compensate for the lag in retooling American industry for munitions production.

As the War Department bureaus became operational in Europe, they began to function with their customary independence by competing against each other, thus driving up prices. The result not only hurt the Americans but raised concerns about inflation among the French. In August 1917, a board appointed to study the problem recommended no action because of the independence granted to the bureaus under existing laws. Not satisfied with the recommendation, the American commander General John J. Pershing created a General Purchasing Board, with his old friend (and future Vice President) Charles Dawes as the General Purchasing Agent. The board reviewed all requirements to search for duplicate requirements and to see where purchases might be consolidated to obtain the best price. As an additional precaution against inflation, a French representative reviewed all agreements and employed their government's right to requisition supplies in the event of excessive pricing. Once established, the board's responsibilities grew steadily to include such areas as labor and electrical supply. To stay within the law, the bureaus executed the contracts.

Success from the General Purchasing Board led Charles Dawes to recommend a similar approach at the coalition level. Pershing endorsed the idea and received support from the other Allied governments. In June 1918, the Military Board of Allied Supply convened its first meeting, with Dawes representing the United States. Although the board's authorities were limited by a requirement for unanimous consent and other restrictions, it proved to be an invaluable forum for coordination of logistical requirements, especially during the final battles of autumn 1918.

In addition to purchasing supplies, the U.S. Army contracted for large

numbers of European workers, for the same reasons that the American military still employs local labor. It reduced the logistical demands upon Americans. In France, however, women formed a disproportionate share of the workforce. That required compliance with French laws regulating the women's working conditions, such as paid leave when their husbands were home on furlough. French women worked in a wide variety of tasks, such as warehousing, baking, clothing repair and even manufacturing candy.

The United States also reached out to neutral nations as a means of reducing the burden on trans-Atlantic shipping. Items unavailable in France, such as food or timber, could be purchased in Europe or North Africa, and transported in shallow draft vessels. These ships could use ports not suitable for oceanic ships, which was a substantial advantage given the limited supply of deep-water facilities.

As the Allied victory approached in November 1918, acquisition systems for both the Army and Navy were functioning impressively. Building the contracting structure proved to be a matter of learning through mistakes both in America and in Europe—but the emphasis was on learning. At home, defense production began to look like the arsenal of democracy later seen in World War II. Purchases in Europe helped to meet the critical gap caused by the shipping shortages. These achievements allowed the AEF to reach its strength of approximately 2 million soldiers with thousands more arriving daily. Quite probably the prospect of endless American reinforcements played a critical role in the German decision to accept an Armistice on Allied terms.

After the Armistice, most of the wartime contracts required termination. This presented an entirely new set of problems.
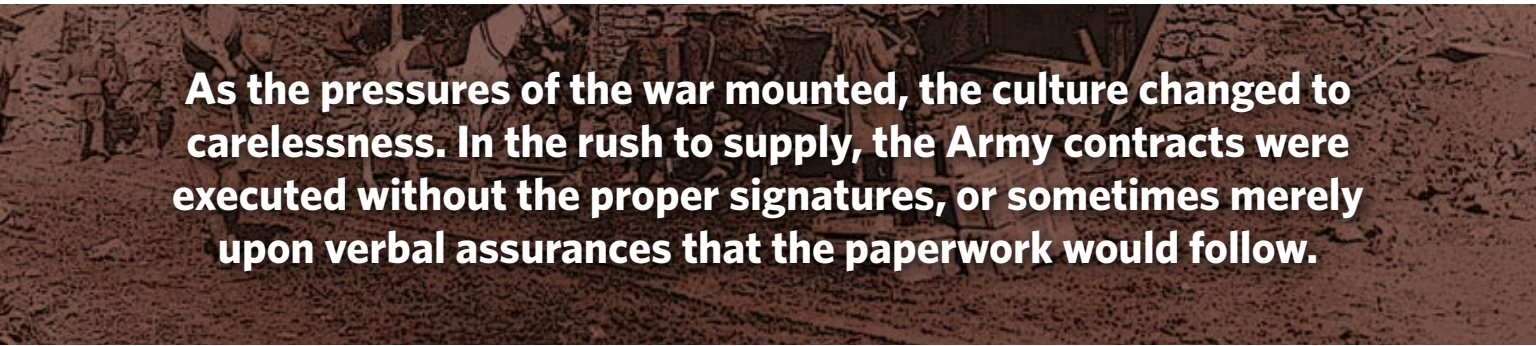

Military Board of Allied Supply (Charles Dawes at front left).

Before 1917, War Department contracting was marked by a scrupulous adherence to every detail. As the pressures of the war mounted, the culture changed to carelessness. In the rush to supply, the Army contracts were executed without the proper signatures, or sometimes merely upon verbal assurances that the paperwork would follow. Shortly after the Armistice, the Comptroller of the Treasury ruled that the government could not pay for approximately $1.5 billion worth of contracts due to some irregularity, despite any good faith numbers in the belief that time lost on careful audits would be more damaging to the nation in the long run. This approach might have been correct, but it did little to ease the perception of grotesque defense industry profits.

In fact, the question of excessive profits became a bitter legacy of World War I. Modern scholarship has concluded that the accusations either were greatly exaggerated or unfounded. Many of the costs were attributable to the lack of planning

> **As the pressures of the war mounted, the culture changed to carelessness. In the rush to supply, the Army contracts were executed without the proper signatures, or sometimes merely upon verbal assurances that the paperwork would follow.**

by the contractor. The ruling applied in the United States and Europe, with the predictable damage to the American reputation in Europe. In May 1919, Congress resolved the issue with the Dent Act that authorized the Secretary of War to pay for the contracts on an equitable basis, provided the claims were filed by June 30 of that year.

Another problem developed from the absence of standardized clauses in the contracts until September 1918. Among other deficiencies, most contracts did not contain provisions for termination in the event of peace. In theory, any contractor could have sued for full execution of the contract; but in practice, the delays in the legal procedure would leave the business bankrupt. Therefore, it was in the interest of both parties to negotiate a settlement. In the absence of any guidance, the government developed a set of principles that included payment for capital investments plus a 10 percent profit, but not anticipatory profits. Additionally, the War Department agreed to advance payments of 75 percent of undisputed costs, and gradual termination of contracts where sudden termination might result in undue hardship to the community. In some cases, the contracts were continued to completion when considered in the best interest of the government. With all parties eager for quick resolution, the negotiations proceeded quickly.

In Europe, the Army used the members of the General Purchasing Board to create the nucleus of a liquidation commission. Termination proceeded along the same principles as in the United States, but effect upon the French economy was not a consideration. A parallel commission considered European contracts within the United States, and the claims were balanced against each other.

Rapid resolution of the outstanding contracts required a cultural shift from monitoring every penny, to accepting rounded

that required rushed production, or else expensive capital investments for a war of uncertain duration. Much of the ammunition profits came from sales to Britain before the United States entered the war. Nevertheless, the charges persisted and received added attention in the 1930s when isolationist Sen. Gerald Nye held sensational hearings describing munitions production as the "merchants of death."

Other military and political leaders gave serious consideration to the lessons of World War I. Creation of the Army Industrial College to study the problems of industrial mobilization was one of the visible legacies of the war. Today this is the Dwight D. Eisenhower School for National Security and Resource Strategy and is part of the National Defense University (formerly the Industrial College of the Armed Forces). In August 1940, President Franklin D. Roosevelt ordered a partial mobilization of national resources to reduce the chaos created by waiting until a declaration of war. He quickly grasped the concept for a War Production Board to prioritize resources and industrial production. The World War I experiences greatly assisted the United States in fighting the next war.

World War I transformed the U.S. Army from an insignificant force into a world-class power. The maturation of contracting and acquisition was essential part of the process. The process was rough and full of learning through mistakes; but ultimately successful.

Supporting the Doughboys is available free of charge at the following website: http://www.armyupress.army.mil/Books/CSI-Press-Publications/World-War-I/. (Or just enter the title in your browser for an Internet search.)

Defense AT&L Wins Two New Awards

We keep winning. Someone once said that we would get tired of winning. Well, not so. Not yet, anyway.

Defense AT&L magazine this spring won its first Hermes Creative Award—a Gold Award for excellence—from the Association of Marketing and Communication Professionals (AMCP) in Dallas, Texas, and its second award from the National Association of Government Communicators (NAGC) in Falls Church, Virginia.

The two NAGC Award evaluators—one from a West Coast utility and other from the Air Force—both heaped praises on the magazine's design and illustrations. "Kudos to the art director for a visually stunning magazine with illustrations and photography that enhance each story," wrote one.

She added: "Excellent government publication. Thorough/informative Contents pages give a glimpse into each article's main topic. The technical writing is precise, and the authors seem to be SMEs [subject-matter experts] in their respective fields." She praised articles for "explaining the concept and then transitioning and going into detail" and said that this was "vital." She also praised the occasional use of humor to level the overall seriousness and earnestness of the work involved. The other evaluator praised the "how to" pieces but wanted to see fewer acronyms and more translation of "government-speak," something that we're always working on and are keen to improve.

Both found the magazine's statement of purpose to be highly successful, as well as its audience identification.

The NAGC judges for the 2018 Blue Pencil & Gold Screen Awards included representatives of private industry, consultants and research organizations as well as federal, state and local agencies. There were 265 entries in all categories. NAGC is an association of public information officers, spokespersons, social media developers and managers and graphic designers. The NAGC award was for the May-June 2017, November-December 2017 and January-February 2018 issues (photo).

AMCP states that its Hermes Award competitions are perhaps the largest of their kind in the world: "Winners range from individual communicators to media conglomerates and Fortune 500 companies." These have included IBM, Honda, Deloitte, Nationwide and United Healthcare insurance companies, John Hancock Professional Financial Services, 20th Century Fox, and the George Washington University.

Hermes said that there nearly 6,000 entries in this year's awards. It said its judges were "industry professionals who look for companies and individuals whose talent exceeds a high standard of excellence and whose work serves as a benchmark for the industry." The Hermes Award was for the January-February 2018 issue (at right in photo).

The two awards recognize the work of *Defense AT&L* Managing Editor Benjamin Tyree, Art Director Tia Gray, and the Editorial and Production personnel and Art and Graphics team of the Defense Acquisition University (DAU) Visual Arts and Press office headed by Randy Weekes. Those staff contributors to *Defense AT&L* include Copy Editor and Circulation Manager Debbie Gonzalez; Production Manager Frances Battle; Nina Austin for online support; Noelia Gamboa for administrative support and photography; and Michael Shoemaker, for editing support. Collie Johnson adds extra information to *Defense AT&L*'s online site.

The magazine's strength derives greatly from the expertise of the many acquisition professionals who author its articles. These include DAU professors, Department of Defense officials, and industry suppliers. *Defense AT&L* provides an excellent venue for exchanging information and lessons learned and for highlighting problems and advances in the acquisition and sustainment processes.

The magazine has won a number of awards in recent years, which is a good indication that we're doing something right. But we're always looking to improve. And our most important judges are our readers and contributors. Let us know via e-mail to datl@dau.mil—not only what you like but what you might wish to see more or less of in our pages. Or respond to the form on page 48. We'll work toward meeting your needs.

—The Editor

Defense **AT&L**

We like happy readers! That's why we want to know what you think. Your feedback will ensure we continue to produce a magazine that is interesting and relevant to your job. Simply respond to the questions below and fax or email this form to *Defense AT&L* Magazine. All responses are anonymous and will be used only to improve *Defense AT&L*'s services.

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Fax: 703-805-2917

Defense AT&L

Purpose

Defense AT&L is a bimonthly magazine published by DAU Press, Defense Acquisition University, for senior military personnel, civilians, defense contractors and defense industry professionals in program management and the acquisition, technology and logistics workforce.

Submission Procedures

Submit articles by e-mail to datl@dau.mil. Submissions must include each author's name, mailing address, office phone number, e-mail address, and brief biographical statement. Each must also be accompanied by a copyright release. For each article submitted, please include three to four keywords that can be used to facilitate Web and data base searches.

Receipt of your submission will be acknowledged in 5 working days. You will be notified of our publication decision in 2 to 3 weeks. All decisions are final.

Deadlines

Note: If the magazine fills up before the author deadline, submissions are considered for the following issue.

Issue	Author Deadline
January–February	1 October
March–April	1 December
May–June	1 February
July–August	1 April
September–October	1 June
November–December	1 August

Audience

Defense AT&L readers are mainly acquisition professionals serving in career positions covered by the Defense Acquisition Workforce Improvement Act (DAWIA) or industry equivalent.

Style

Defense AT&L prints feature stories focusing on real people and events. The magazine seeks articles that reflect author experiences in and thoughts about acquisition rather than pages of researched information. Articles should discuss the individual's experience with problems and solutions in acquisition, contracting, logistics, or program management, or with emerging trends.

The magazine does not print academic papers; fact sheets; technical papers; white papers; or articles with footnotes, endnotes, or references. Manuscripts meeting any of those criteria are more suitable for DAU's journal, *Defense Acquisition Research Journal (ARJ)*.

Defense AT&L does not reprint from other publications. Please do not submit manuscripts that have appeared elsewhere. *Defense AT&L* does not publish endorsements of products for sale.

Length

Articles should be 1,500–2,500 words.

Format

Send submissions via e-mail as Microsoft Word attachments.

Graphics

Do not embed photographs or charts in the manuscript. Digital files of photos or graphics should be sent as e-mail attachments. **Each figure or chart must be saved as a separate file in the original software format in which it was created.**

TIF or JPEG files must have a resolution of 300 pixels per inch; enhanced resolutions are not acceptable; and images downloaded from the Web are not of adequate quality for reproduction. Detailed tables and charts are not accepted for publication because they will be illegible when reduced to fit at most one-third of a magazine page.

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