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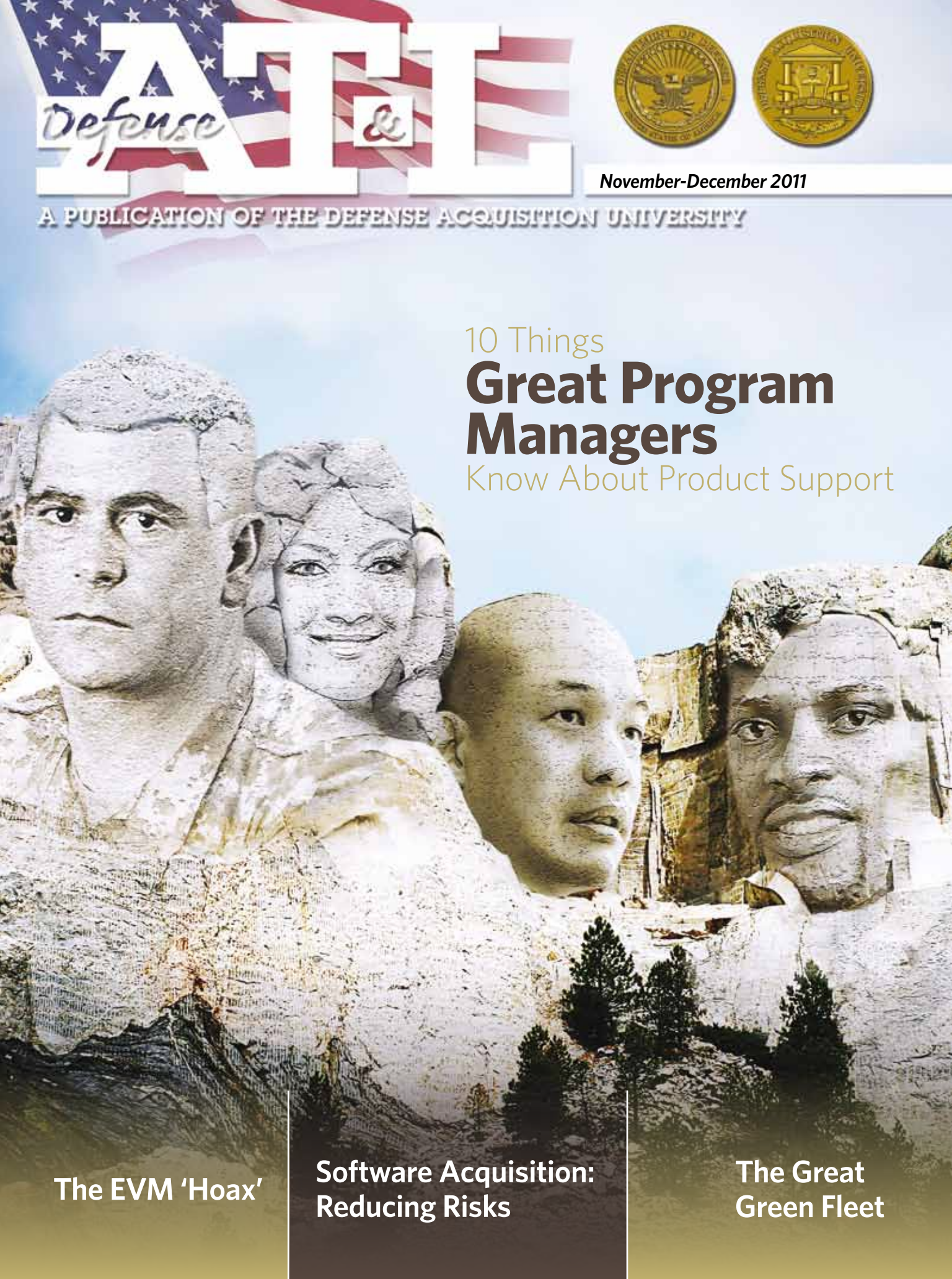

10 Things Great Program Managers Know About Product Support

The EVM 'Hoax'

Software Acquisition: Reducing Risks

The Great Green Fleet

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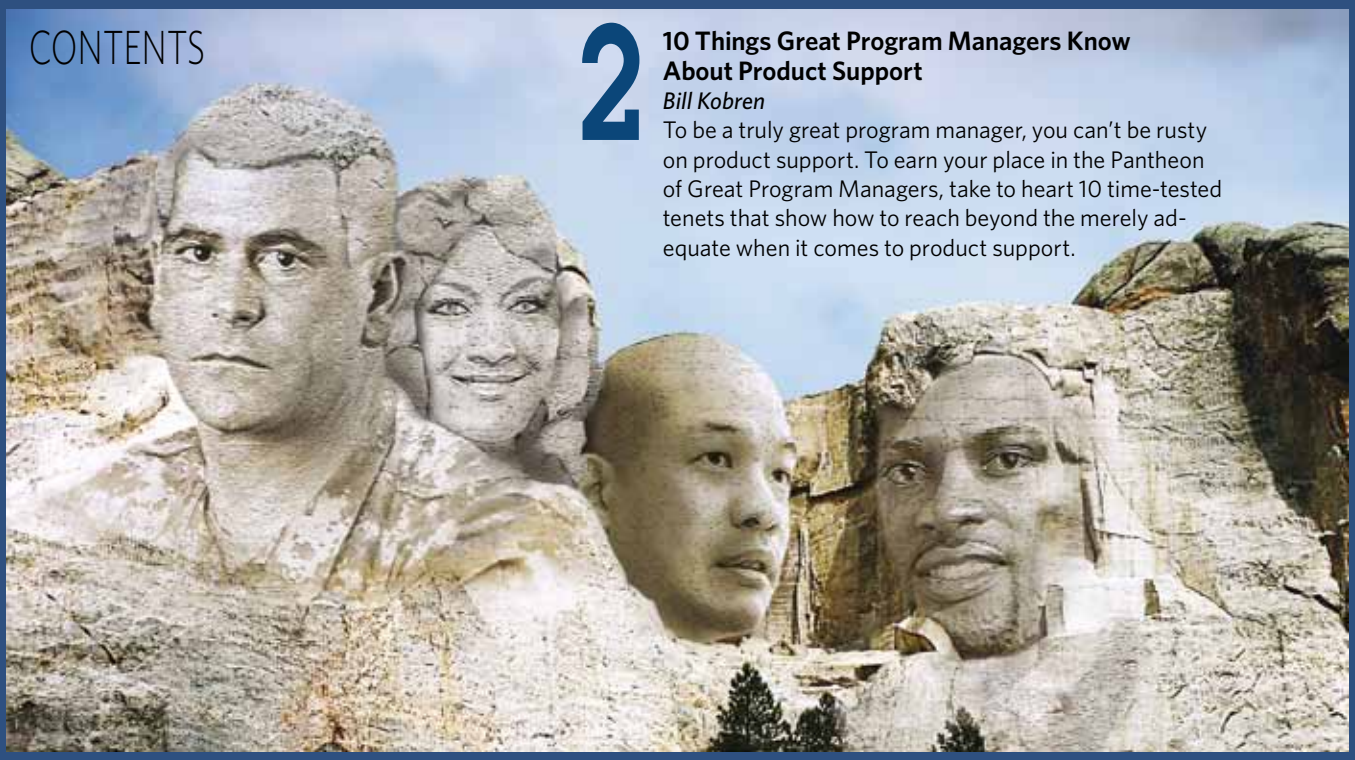

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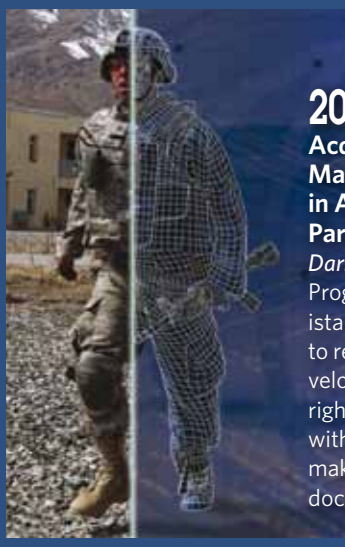

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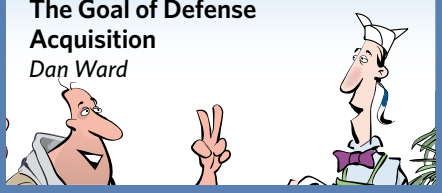

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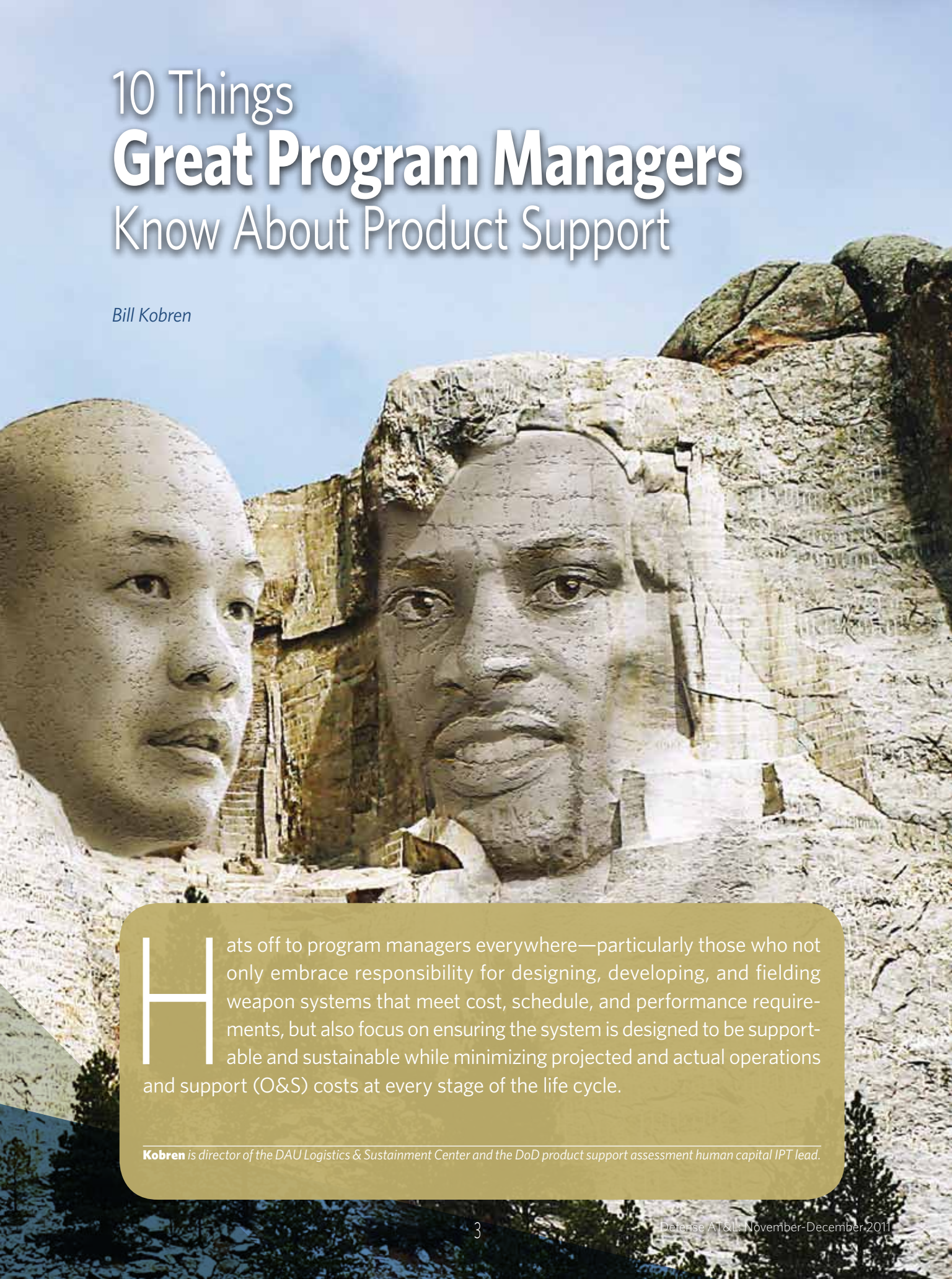
"Speaking of superheroes, here's to the program manager (PM)! In my opinion, no job scope in the federal government compares to the responsibilities of the PM. No wonder PMs sometimes appear selective in the balls they attempt to juggle. Now here come the "loggies" with another big ball to throw at the juggler: PM responsibility for total life cycle systems management as mandated in DoD Directive 5000.01, paragraph E1.29. Being a life cycle manager is not an insignificant or marginal duty."

—Randy Fowler
Former DASD (Materiel Readiness)

10 Things Great Program Managers Know About Product Support

Bill Kobren



Hats off to program managers everywhere—particularly those who not only embrace responsibility for designing, developing, and fielding weapon systems that meet cost, schedule, and performance requirements, but also focus on ensuring the system is designed to be supportable and sustainable while minimizing projected and actual operations and support (O&S) costs at every stage of the life cycle.

Kobren *is director of the DAU Logistics & Sustainment Center and the DoD product support assessment human capital IPT lead.*

At the end of the day, reliability (or lack thereof) is a (if not the) primary driver of future product support requirements.

Easier said than done, of course. You've heard said—and may have even uttered them a few times yourself—things like "If I have to choose between a cancelled sustainable program today and getting through the next major milestone..." Or "I'm dealing with the alligators closest to the boat." Or perhaps "Logistics is my only discretionary account." Or "Sustainment is my design trade space." Or "That's years away; we'll address it later."

In an era of rapidly approaching fiscal austerity, aging weapon systems, and fewer new program starts, great PMs recognize they must also be product support experts, discarding remnants of short-term thinking and investing scarce resources in reliability, availability, and maintainability across the life cycle to reduce ownership costs and enhance warfighter readiness.

Given the vast range of mandates already levied upon you, if you'll permit, I offer a list of 10 things to know about product support—particularly if you are or aspire to become a great PM who truly relishes the challenge of delivering a supportable, sustainable, maintainable, reliable, cost-effective weapon system the warfighter will rely on for decades to come.

10. I'm the life cycle manager (LCM): The product support buck stops with me.

Take ownership. Total life cycle systems management is ensconced in DoD 5000 policy for a reason. It is foundational. With DoD product support and sustainment costs exceeding $200 billion a year, LCM is nothing short of imperative. Best value product support solutions require a (very) long-term perspective and up-front investments. Because best value often does not equate to lowest acquisition cost, great PMs focus first and foremost on metrics-driven optimization of life cycle cost, warfighter readiness requirements *and* overall system availability, great PMs recognize LCM cannot simply be viewed as "something the loggies will take care of later."

9. The right product support manager (PSM) is key. Demand excellence and accept nothing less.

Although great PMs intuitively know they are ultimately responsible for life cycle management, the PSM plays an integral role on your behalf in implementation and execution. By statute and in policy, the PSM is accountable to you to:

- Provide weapon-systems-product-support subject-matter expertise for the execution of your duties as total life cycle systems manager.
- Develop and implement a comprehensive, outcome-based product support strategy.
- Promote opportunities to maximize competition while meeting the objective of best-value long-term outcomes to the warfighter.
- Leverage enterprise opportunities across programs and DoD components.
- Leverage appropriate analytical tools and conduct appropriate cost analyses to craft your product support strategy.
- Develop and implement appropriate product support arrangements, assess and adjust resource allocations and performance requirements for product support to meet warfighter needs.
- Optimize implementation of the product support strategy.

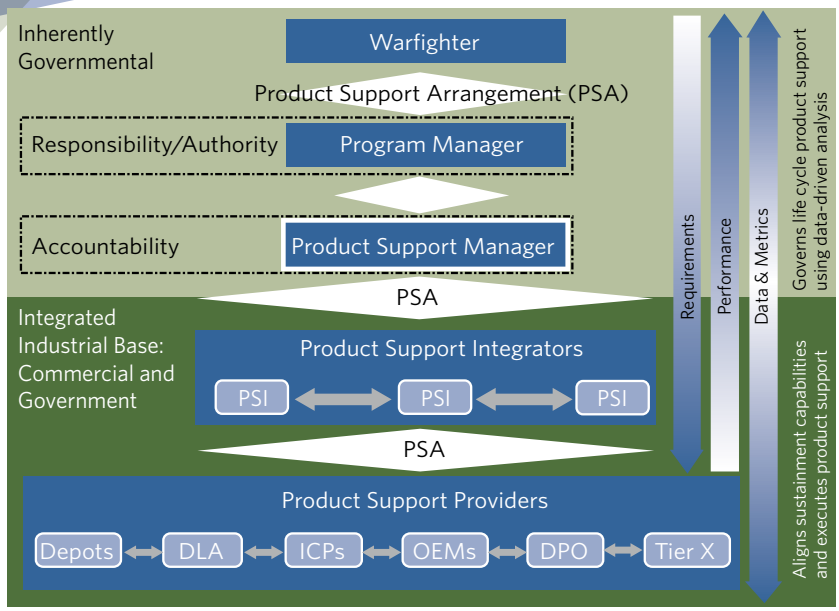
To achieve this on your behalf, the PSM also documents your product support strategy in a life cycle sustainment plan (LCSP), conducts periodic product support strategy reviews, and revalidates the supporting business case analysis (BCA) prior to each product support strategy change or every 5 years, whichever occurs first.

The PSM is a key teammate; understand their responsibilities, ensure they are well trained, and hold them accountable. Know what deliverables your PSM is responsible for at every milestone. Ask the hard questions: Does our product support strategy represent "best value" support to the warfighter? How do you know? Familiarize yourself with the DoD *PSM Guidebook* to better understand PSM roles and responsibilities. Study the DoD Product Support Business Model (PSBM, Figure 1) to better understand key interfaces and relationships. A word of advice: To effectively implement the PSBM, your systems engineers and PSM must be "joined at the hip." Corollary 1: your cost estimators, business and financial managers, and PSM must also be "joined at the hip." Corollary 2: Your contracting officer and PSM must be "joined at the hip." Corollary 3: You get the picture; interdisciplinary integration is essential for successfully devising, implementing, and improving a long-term best-value product support strategy.

8. Everything that really matters can pretty much be summed up in a single page.

On April 5, 2010, the USD (AT&L) issued a definitive policy memorandum titled "Strengthened Sustainment Governance for Acquisition Program Reviews." It not only mandated a sustainment "quad chart" focusing on product support strategy, funding, and implementation "big rocks," but perhaps

Figure 1. Product Support Business Model (PSBM)



The PSM is the warfighter's principal product support agent responsible for incentivizing PSI(s) to achieve warfighter requirements. *Source:DoD PSM Guidebook.*

more importantly, through the four key life cycle sustainment outcome metrics, it articulates what really counts: availability, reliability, O&S cost, and mean down time (Figure 2). Yet again, affordable readiness is clearly paramount. It concisely conveys to senior decision makers that O&S costs are to your programmatic cost analyses, regardless of program stage in life cycle. Know this chart like the back of your hand. Review it regularly with your PSM and life cycle logistics team. Regarding the data contained on the chart, ask how they know. Ask not only how current results can be improved, but what we are doing to improve them. Ensure warfighter customers and the resource sponsors are engaged.

7. Design systems with supportability in mind.

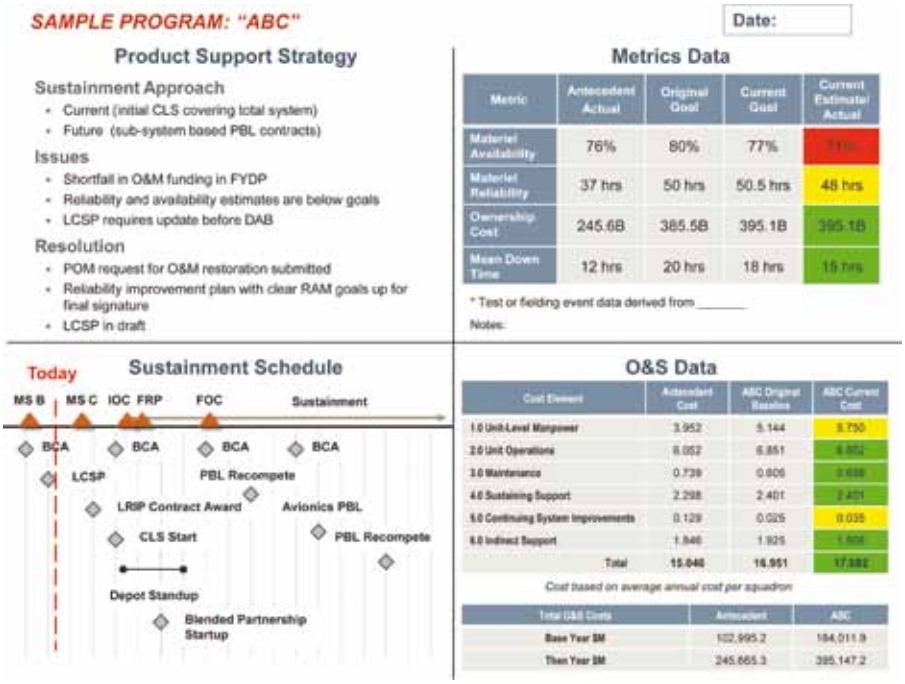
Because DODD 5000.01 identifies supportability as the fourth element of acquisition, cost, schedule, and performance alone are no longer sufficient. To successfully achieve this requirement, it's imperative to first get the product support requirements right—right from the start. Work with the requirements community to understand what is technically and fiscally feasible. Work together to ensure product support requirements are not gold plated or that they lock you into future requirements creep. Invest in long-term, outcome-based life cycle product support strategies: metrics, performance-based agreements, data, and rigorous product-support business-case analysis required to justify and measure success. Leverage evolutionary acquisition strategies. A word of caution: Resource constraints are a reality on every program; don't let product support considerations be the first casualty when making design trades.

All this should serve as a constant reminder that reliability (or lack thereof) is a (if not *the*) primary driver of future product support requirements. Design your system with supportability in mind. Earlier is always better when devising and implementing a robust reliability, availability, and maintainability (RAM) strategy. Vigorously embed well-thought out technical data rights strategies, risk management, supportability analysis, Condition Based Maintenance Plus, value-engineering, technology insertion, continuous modernization, sustaining engineering, product improvement programs, and demilitarization & disposal planning into your program.

6. Product support strategies must be iteratively crafted, revalidated, and documented.

Regularly ask yourself (and your PSM): What is my product support strategy? How do I know it's the right one? Can I explain it to those unfamiliar with my program? Are my PEO,

Figure 2. Sustainment Quad Chart



milestone decision authorities, and warfighter customers on board with it? Does it meet their requirements not just near-term, but is it flexible and visionary enough to do so for the life of my program?

Built upon the statutory and policy requirements levied on the PSM to develop, document, and justify outcome-based life cycle product support strategies, first understand the requirements, conduct supportability analyses, and complete the first of many future product support business case analyses. To document the results of these analyses, use the powerful new 12-step DoD Life Cycle Product Support Strategy Process Model (Figure 3), contained in the April 2011 *PSM Guidebook,* and the "Document Streaming—Life Cycle Sustainment Plan" (LCSP) policy memo, issued Sept. 14, 2011, by the principal deputy USD (AT&L). Because both the product support BCA and the LCSP are intended to be iterative, each will be regularly updated for the life of the program. Ultimately, the LCSP is a program's primary management tool to document the program's product support strategy and satisfy the warfighter's sustainment requirements.

5. Twelve new integrated product support (IPS) elements provide the framework.

The traditional 10 integrated logistics support (ILS) elements were recently replaced by a significantly more robust set of 12 integrated product support (IPS) elements (Figure 4). The "ILS to IPS transition" recognized the broader context and integrated interdisciplinary nature of product support, and was a major enhancement of DoD life cycle management. Introduced in the April 2011 *PSM Guidebook*, details can be found in the *2011 IPS Element Guidebook*, to be issued in the coming months. Familiarize yourself with them, seek to understand how they are integrated, and consider the implications if the IPS elements are not an integral part of both the product support and acquisition strategies.

4. Obsolescence and DMSMS will eat your lunch (along with breakfast and dinner if you're not careful).

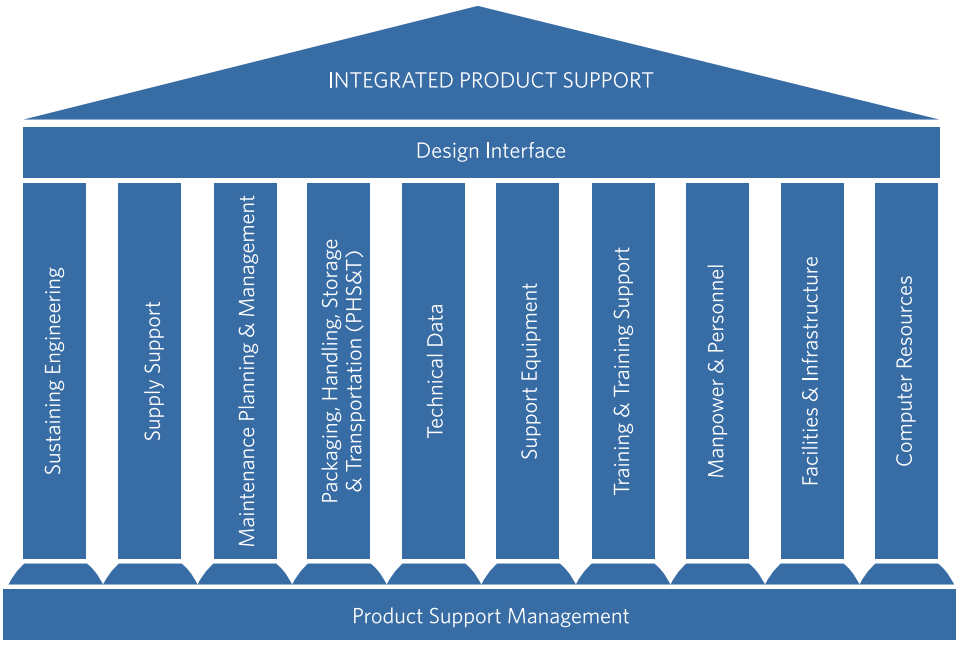
Proactively anticipate, plan for and aggressively tackle obsolescence and Diminishing Manufacturing Sources and Materiel Shortages (DMSMS) issues. Leverage the extensive resources of the Defense Standardization Program Office (DSPO), the Government-Industry Data Exchange Program (GIDEP), Defense Logistics Agency, the SD-22 "Diminishing Manufacturing Sources and Materiel Shortages: A Guidebook of Best Practices and Tools for Implementing a DMSMS Management Program," and a series of DMSMS-training modules available on the DAU Continuous Learning site. Ensure continuous modernization, technology insertion, major modifications, and service life extensions are key components of product & process improvement across the lifecycle. And recognize that despite the importance of developing, implementing, and incorporating a proactive DMSMS and obsolescence mitigation program into your product support strategy, up-front and ongoing investments of manpower and funding will be necessary.

Figure 3. DoD Product Support Strategy Process Model

3. PBL is a powerful force multiplier.

Defined as "an outcome-based product support strategy that plans and delivers an integrated, affordable performance solution designed to optimize system readiness," when properly applied, Performance Based Life Cycle Product Support (PBL) support strategies have repeatedly demonstrated the ability to improve system availability, drive reliability improvements, enhance warfighter support, tackle process inefficiencies, proactively mitigate obsolescence and DMSMS issues, and often reduce O&S costs in the process. In short, PBL is an important and highly integrative enabler of life cycle management success. The continuation of introductory vignette at the beginning of this article reaffirms this: "PBL, with its outcome-focused principles, metrics, and incentives, serves as a simplifying strategy for the PM. PBL offers a one-stop approach for

Figure 4. Integrated Product Support (IPS) Elements



Product support is enabled by 12 integrated product support (IPS) elements, designed to deliver system readiness and availability while optimizing system life cycle cost.

the PM to perform effectively as the life cycle manager. PBL is the best enabler of the total life cycle systems management concept; it provides a means for the resource-constrained program management office to develop, implement, and manage the sustainment of a system over its life cycle."

This was revalidated in an ongoing DoD study titled "Project Proof Point," conducted as an objective, data-driven assessment of outcome-based product support strategy performance, and how these arrangements can be improved as we move forward. The study's first phase examined ten major PBL programs, and the results were encouraging to say the least, confirming "PBL arrangements reduce DoD's cost per unit of performance while simultaneously driving the absolute levels of system, sub-system, and component readiness/availability." Assuming your program's product support BCA produces similar results, take full advantage of the myriad benefits PBL can deliver for your program and key stakeholders.

2. Maintenance planning is a big deal. So is supply chain management.

According to the DoD *Maintenance Fact Book*, "DoD materiel maintenance is big business, costing about $80 billion in FY 2009. This total funds 653,000 military and civilian maintainers and thousands of commercial firms—all devoted to the maintenance of 290 ships, 14,000 aircraft, 800 strategic missiles, 361,000 ground combat and tactical vehicles, and myriad other DoD weapon systems, components, and equipment items." Hence, maintenance planning and maintenance management is among the most critical of the IPS elements. Design in maintainability to reduce life cycle costs, as well as to ease training, technical data, support equipment, and manpower burdens on the warfighter. Commit to rigorous and timely verification and validation of maintenance and repair procedures and technical publications. Plan early for long-term depot level maintenance requirements and depot source of repair decisions. Address statutory depot maintenance statutory requirements in your product support strategy. Leverage public-private partnerships with industry to craft a robust supply chain and tap the best capabilities of both the private and public sectors.

1. Acquisition and sustainment are two sides of the same coin.

For those overseeing programs in early acquisition, don't lose sight of the fact that the hard work is just beginning when the system is fielded. Great PMs recognize the need for early and continued emphasis on getting system deployment, delivery, site activation, and field support planning right. Did you appropriately address facilities, information technology, training, technical manual/order, support equipment, and manpower requirements early in system development? Has your team anticipated and proactively addressed political, economic and environmental impacts? Integration with existing infrastructure? Required infrastructure upgrades?

For fielded systems, a key aspect of the job is to support the existing design, improve the system, and enhance the support. This entails constantly gathering and analyzing field data, taking timely action to correct or avoid negative trends, and

The PSM is a key teammate—understand their responsibilities, ensure they are well trained, and hold them accountable.

Key Product Support Resources & Links

Product Support Policy, Guidance & Tools Repository (https://acc.dau.mil/productsupport)

Life Cycle Sustainment Plan Outline (https://acc.dau.mil/lscsp-outline)

Product Support Manager (PSM) Reference Repository (https://acc.dau.mil/psm)

Product Support Manager's (PSM) Guidebook (https://acc.dau.mil/psm-guidebook)

Business Case Analysis (BCA) Guidebook (https://acc.dau.mil/bca-guidebook)

Logistics Assessment (LA) Guidebook (https://acc.dau.mil/la-guidebook)

Integrated Product Support (IPS) Element Guidebook (https://acc.dau.mil/productsupport)

Life Cycle Sustainment Plan (LCSP) Outline (https://acc.dau.mil/productsupport)

Logistics & Sustainment Blog (https://dap.dau.mil/career/log/blogs/default.aspx)

Product Support Training (http://icatalog.dau.mil/onlinecatalog/tabnavcl.aspx?tab=CLL)

taking the time to visit the warfighter where they live and work. Talk to the operators, maintainers, and supply managers. Find out what issues are hurting their heads. Do they have ideas for improving the system? Are there spare parts, reliability, or repair process issues? You will probably already be aware of such problems, but if not, trust me: The troops in the field will ensure you know about it!

Regardless of where your program is in the acquisition cycle, these 10 things to know about product support will serve you well in achieving optimized, affordable readiness for our warfighters.

I consider myself extremely fortunate, having had the privilege to work for several great PMs earlier in my career. Each recognized the importance of getting foundational requirements right. Each chose to make long-term investments in product support in order to reduce life cycle costs. Each demanded nothing less than excellence from their logisticians. To a one, they refused to defer difficult product support decisions. Each regularly and candidly communicated with key product support stakeholders. And each knew their decisions would have ramifications for decades to come. So, when it comes to product support, I encourage you to emulate their example, reflect on the things discussed in this article, and in so doing, establish yourself as a truly great PM in your own right!

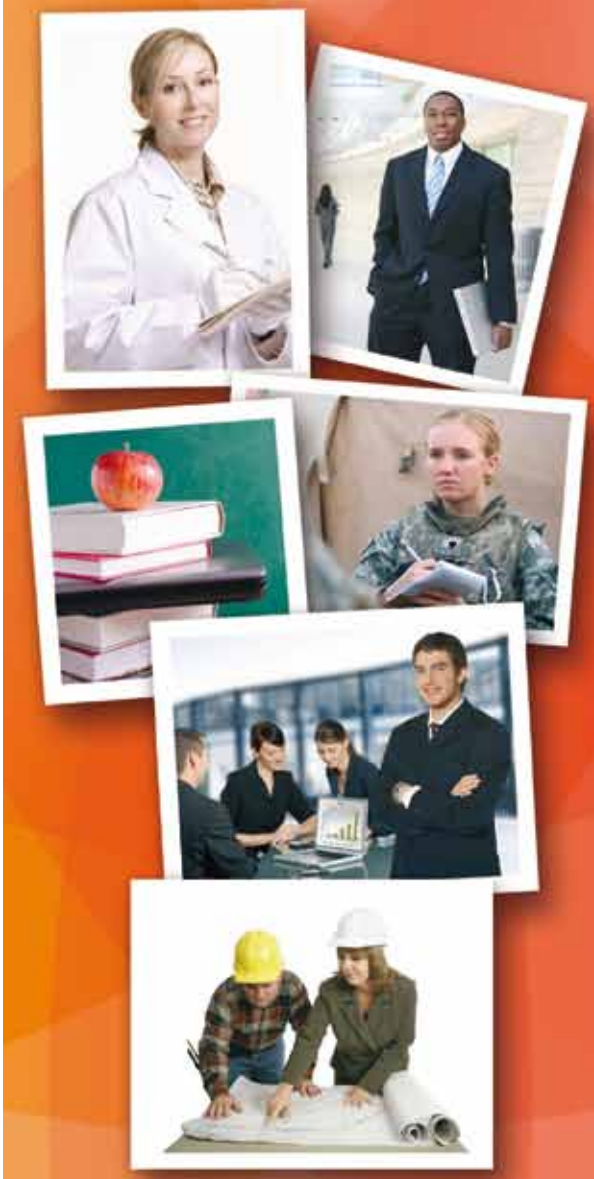
The author can be contacted at **bill.kobren@dau.mil.**

For more on product support, look for the March-April 2012 special issue of *Defense AT&L.*

Farewell to Eduard Boyd

Ed Boyd, director of DAU's Visual Arts and Press department since 2003, will retire on Dec. 31, after nearly 40 years of service in the Department of Defense. Ed served for many years in the Army, working in graphic arts and in recruiting. He arrived at DAU in 1977 and has served under all but one DAU president. Ed's capable leadership, unflagging sense of humor, and joyous can-do spirit will be greatly missed by everyone who has had the privilege of working with him.

We wish him and his wife Sharon (a longtime DAU staff member) the very best in their well-deserved retirement.



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Best Practices Clearinghouse (BPCh)

A single, authoritative source of useful, validated, actionable practice information

Do these issues sound familiar?

- There are many practice lists to choose from but no guidance for selecting specific practices
- "Proof of practice" effectiveness is usually not available
- The connection between practices and specific program risks are undefined
- Success factors for practices are not well documented
- Implementation guidance is often missing
- The cost and timeliness associated with implementing and using the practices are often not specified

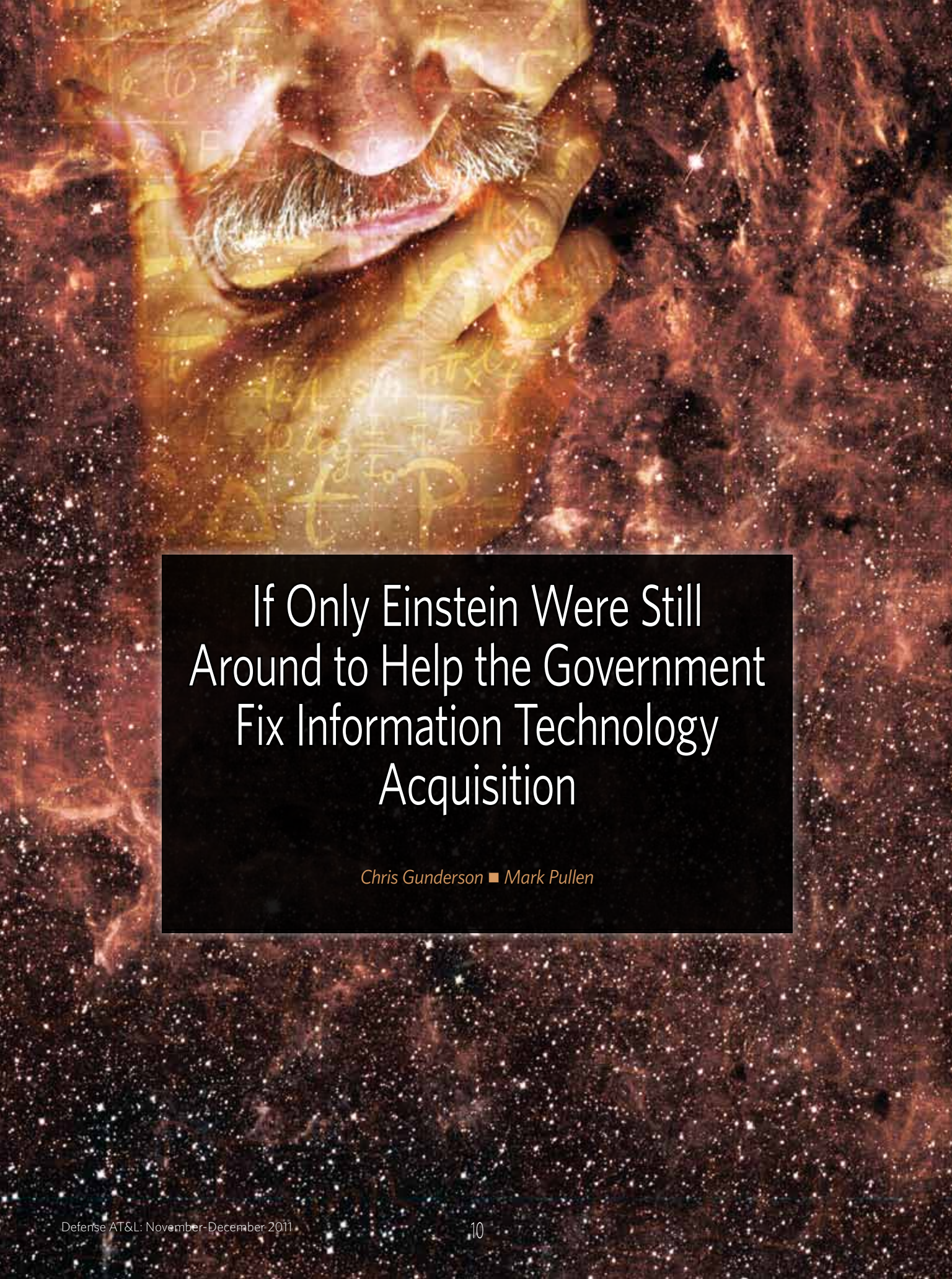
The BPCh can help by:

- Serving as the authoritative source for practices in DoD and industry
- Targeting the needs of the software acquisition, software development, systems engineering, program management, and logistics communities
- Connecting communities of practice, centers of excellence, academic and industry sources and practitioners
- Promoting and assisting in the selection, adoption, and effective utilization of best practices and supporting evidence

For more information, visit the BPCh web site at https://bpch.dau.mil, or contact:

Mike Lambert
michael.lambert@dau.mil
703-805-4555

John Hickok
john.hickok@dau.mil
703-805-4640



If Only Einstein Were Still Around to Help the Government Fix Information Technology Acquisition

Chris Gunderson ■ Mark Pullen

The various Defense IT trade journals are offering increasingly nuanced discussions of how open source software (OSS), service oriented architecture (SOA), Agile software development, and the "cloud" concept can and should be applied to streamline, accelerate, and improve the defense enterprise (DE) IT acquisition process. It is refreshing to see these subtly nuanced and pragmatic views in lieu of the "religious" black-and-white arguments that had here-to-fore been typical in the defense-related IT literature. However, generally absent are discussions of widespread success at these various modern IT paradigms within the DE. Why is that?

Our sense is that the DE has indeed little widespread success at deploying modern IT paradigms such as SOA, OSS, "cloud," or "Agile." In our view, the elephant in the room is that to leverage any of these at scale, the DE must be generally competent to field large IT systems. Clearly, that is not the case. If the myriad GAO and Defense Science Board (DSB) reports over the last decade were not sufficiently convincing, surely the 2010 National Defense Authorization Act (NDAA) Section 804 is.

Section 804 is a succinct mandate requiring OSD to explain to Congress how it aims to finally fix its IT acquisition process. In response to Section 804, OSD has submitted its November 2010 report (*A New Approach for Delivering IT Capability to the DoD*) and established an IT Acquisition Reform Task Force (IT-TF). The IT-TF reports to Deputy Secretary of Defense William Lynn and is led by Deputy Chief Management Officer Elizabeth McGrath.

We believe that Lynn's and McGrath's success at responding to the congressional mandate will depend on their ability to address Einstein's dilemma. Recall that Einstein thought trying to solve a problem with the same approach that created the problem was crazy. It seems to us that Defense leaders should take a cue from Einstein and ask themselves why the dozens of previous reports, roadmaps, and mandates aimed at fixing aspects of Defense IT acquisition have not led to the envisioned successes. Perhaps it is because the tacit assumption made by these reports is that the as-is/to-be gap can and will be bridged by the existing Pentagon processes. So far, that assumption has proven false. Einstein might have said that it is time for new assumptions.

One effective technique—arguably the most effective technique—for mitigating risk in any new initiative is to assign the best person to the project, free him or her from other responsibilities, allow him or her to pick an elite team, and empower the team with sufficient resources and top cover to succeed. This is the approach good leaders invariably apply when the stakes are high.

'Sgt. Rock! Pick your best five soldiers and TAKE THAT HILL! We'll cover you.'

The typical approach to executing a new initiative within the DE bureaucracy is to assign it as additional duty to an already overtasked senior executive. That senior executive inevitably establishes a working group(s). The working group is composed either of "stuckees" involuntarily assigned for various reasons (rarely associated with expertise), or volunteers who choose to join the project because they have a vested interest.

The working group meets on a regular schedule. It eventually delivers a report of some sort. Any subsequent success "on the ground" requires that someone actually read the report and do something about it. In our experience with this approach, success is rare.

Einstein might have suggested that OSD should try the former approach this time around—i.e., find the metaphorical Sgt. Rock, tell him/her to take the hill, and cover this person while she/he heroically does that.

Phenomena such as eBay, Amazon, Google, Travelocity, IRS eFile, Wikipedia, Facebook, the iPhone, Linux, and others have clearly influenced the thinking of Defense leadership. That is, Defense leaders have recognized how IT-related paradigms like SOA, Agile, cloud, and OSS have contributed to the massive success of these enterprises. Defense concepts like "net-centric operations/warfare" and, lately, "cyber operations/cyber warfare" aim to harvest similar success at scale through application of the same IT paradigms. Indeed, the Defense netcentric implementing policies and ensuing initiatives seem to be based on the notion that particular technologies can, in and of themselves, bring about desired outcomes. The hypothesis seems to be "If the DE provides generic technologically-

Gunderson *is a research associate professor of information science at the Naval Post Graduate School in Monterey, Calif. He retired from the Navy as a captain after 27 years of service, with various leadership roles in information system interoperability.* **Pullen** *is a professor of computer science and director of the Center of Excellence in Command, Control, Communications, Computing and Intelligence at George Mason University, Fairfax, Va. He previously was a program director at the Defense Advanced Research Projects Agency (DARPA).*

Defense leaders should take a cue from Einstein and ask themselves why the dozens of previous reports, roadmaps, and mandates aimed at fixing aspects of Defense IT acquisition have not led to the envisioned successes.

enabled network resources, then military programs will reap untold benefits."

However, in our research, we find very few people who argue that programs like Netcentric Enterprise Services (NCES), Defense Travel Service (DTS), Navy Marine Corps Intranet (NMCI), Defense Knowledge Online (DKO), the various "government open source" software repositories—not to mention the various C4ISR programs embracing SOA—have had the degree of success-at-scale of their commercial exemplars.

The various Defense netcentric policies and initiatives inevitably fail to recognize the fundamental fact that, in all the impressive exemplars, it is value proposition (VP) and the supporting business model that drives success at scale. In other words, technologies serve as catalysts *if and only if* they enhance the VP, business model, or both. For example, the travel business was flourishing long before Travelocity entered the picture. Travelocity decreased time and cost associated with existing lucrative transactions by applying web services and service architecture. Likewise, Amazon, eBay, and IRS eFile, within their chosen domains. Collaborative portals such as Java.net and SourceForge allow compelling OSS projects to scale globally. Non-compelling OSS projects wither and die on the same collaborative portals that support the massively successful projects, as do non-compelling Wiki sites.

In other words, technologists can fuel success when they follow the money. By carefully observing existing patterns of transactions, providing tools that reduce barriers to those transactions, and expanding the market space, IT practitioners can fan sparks into bonfires by providing "enterprise" capabilities. However, they need to start where the sparks already exist.

Therefore, Einstein might have suggested that the DE stop pushing particular technologies, and focus on "market forces." That is, for the DE to succeed with OSS, SOA, cloud, Agile, etc, the DE must seek out existing "commerce" among members of the defense community that might benefit from better IT tools. Studying the existing functional transaction space will enable discovery of VPs and enabling business models—that is, "acquisition strategies"—that resonate within a particular ecosystem of competent and empowered providers and consumers of the required IT capabilities.

Study of success cases reveals that an effective business model/acquisition strategy inevitably recognizes two basic truths: you get what you measure, and you get what you pay for. Measuring the right things and then contracting for the right things are both critical to success. Today the DE measures compliance with bureaucratic requirements and size of empire. DE executes its program and budget accordingly. DE programs outsource engineering of very large complex systems, via long serial processes. Hence, DE programs tend to deliver capability that is archaic, late, and over budget.

Needed Changes for Needed Outcomes

What fundamental changes to that "outsource-your-brains-and-measure-compliance" model will catalyze the desired fundamental changes in program output?

At least one DE community of practice is embracing this Einsteinian approach to IT Acquisition Reform. Members of the USN and USMC Intelligence Community, under the Aegis of the Section 804 mandate, are establishing what they call a Naval-Intelligence Capability Evolution (N-ICE) Pilot Portfolio. The HQ Marine Corps director of intelligence, and the USN Program Executive Office for Command, Control, Communications, Computers and Intelligence (PEO C4I) Principal Deputy for Intelligence, are the leaders of this community. Their near-term objective is to deliver critical persistent intelligence, surveillance, and reconnaissance (PISR) to blue forces on the tactical edge in Afghanistan.

Generally, the N-ICE value proposition is better speed to better capability. The industrial jargon for this universally accepted approach is time to value. For a fixed IT budget, the objective is to optimize Value of Acquisition (VoA), where:

VoA = (value per capability) x (number of capabilities) ÷ (calendar time to develop/test/certify) ÷ (cost).

Value is the critical parameter. Given that for N-ICE, the application domain is intelligence, value is most likely to be associated with the quality of collection, processing, and delivery of information. Time and cost either enhance or detract from basic value. If either time or cost grows to the point where VoA drops below some threshold value, it is time to walk away from sunk costs, and/or de-scope the effort, in order to get something useful in the warfighters' hands in time to make a difference.

Generally the N-ICE business model is value-off-the-shelf (VOTS). Off-the-Shelf (OTS) means a capability is readily consumable—that it is pre-certified for DE use, is available via convenient procurement vehicle, works out of the box, and comes with life cycle support. The N-ICE approach is to: (1) buy down as much risk as possible with pure OTS capability and deploy that capability immediately; (2) identify specific gaps between existing OTS capability and the total requirement; (3) close the OTS gap by investing within the COTS ecosystem to develop new OTS capabilities.

In this model, it is critically important that the government retain full intellectual property rights to the IT the government pays to develop. One good way to do that is to require developers to use open source licenses for government-developed components. In any case, this approach requires an objectively specified "modular open systems approach" ("MOSA," which is un-defined jargon in many DE IT policy documents). The industrial best practice re MOSA is called "product line architecture" (PLA). PLA provides detailed technical specifications for persistent modular IT "platforms." The IT platform plug-and-play specifications, then, allows efficient re-use of components and enables lucrative time-to-value for multiple IT-enabled enterprises.

Apple iPhone, iPad, and iPod, and MacBooks all share the same PLA, for example. Google and Microsoft likewise specify their own versions of PLA. In industrial PLA "open" is obviously a relative term. Consider, for example, iPhone's proprietary development environment vs. Android's open source environment. Both are "open" to their own large diverse ecosystems of developers. However, in every case of effective PLA, "open" is described objectively and in great technical detail. That is not the case in most defense system architectures.

The VP of PLA for provider enterprises is that it can prevent internal verticals from competing with each other on the basis of basic infrastructure. Rather, enterprise PLA allows internal verticals to efficiently differentiate themselves at the application level. The VP of PLA for consuming enterprises is that it allows a single point of access to a multitude of capability providers—preventing lock-in to any particular provider. (Regardless of whether you like Mac or Window, iPhone or Android, you can have your choice of any number of competing application solution providers.) Significantly, in the traditional approach to defense acquisition, all the provider enterprise verticals—the individual programs—have no incentive or central governance structure to cause them to build on a common PLA. They do indeed compete with each other, in the Pentagon process, for the resources to build their own closed infrastructure. Members of the defense consumer enterprise are locked in, either by regulation or tradition, to particular providers. Again, Einstein might suggest that a fundamental change is in order.

The N-ICE business model recognizes the need to make this fundamental change. Further, the N-ICE community recognizes that information assurance (IA) and information interoperability (IoP), and the ironclad requirement to certify systems for both, are long poles for all defense acquisition activities. Any improvement to the current arcane, artisan, approach to IA and IoP certification would be universally considered a lucrative VP. Accordingly, the N-ICE approach applies emerging virtualization and semantic technology to build IA and IoP into its PLA. The N-ICE community of practice includes experts at the NSA and experts at the Joint Interoperability Test Command (JITC), who are vested in the success of this approach.

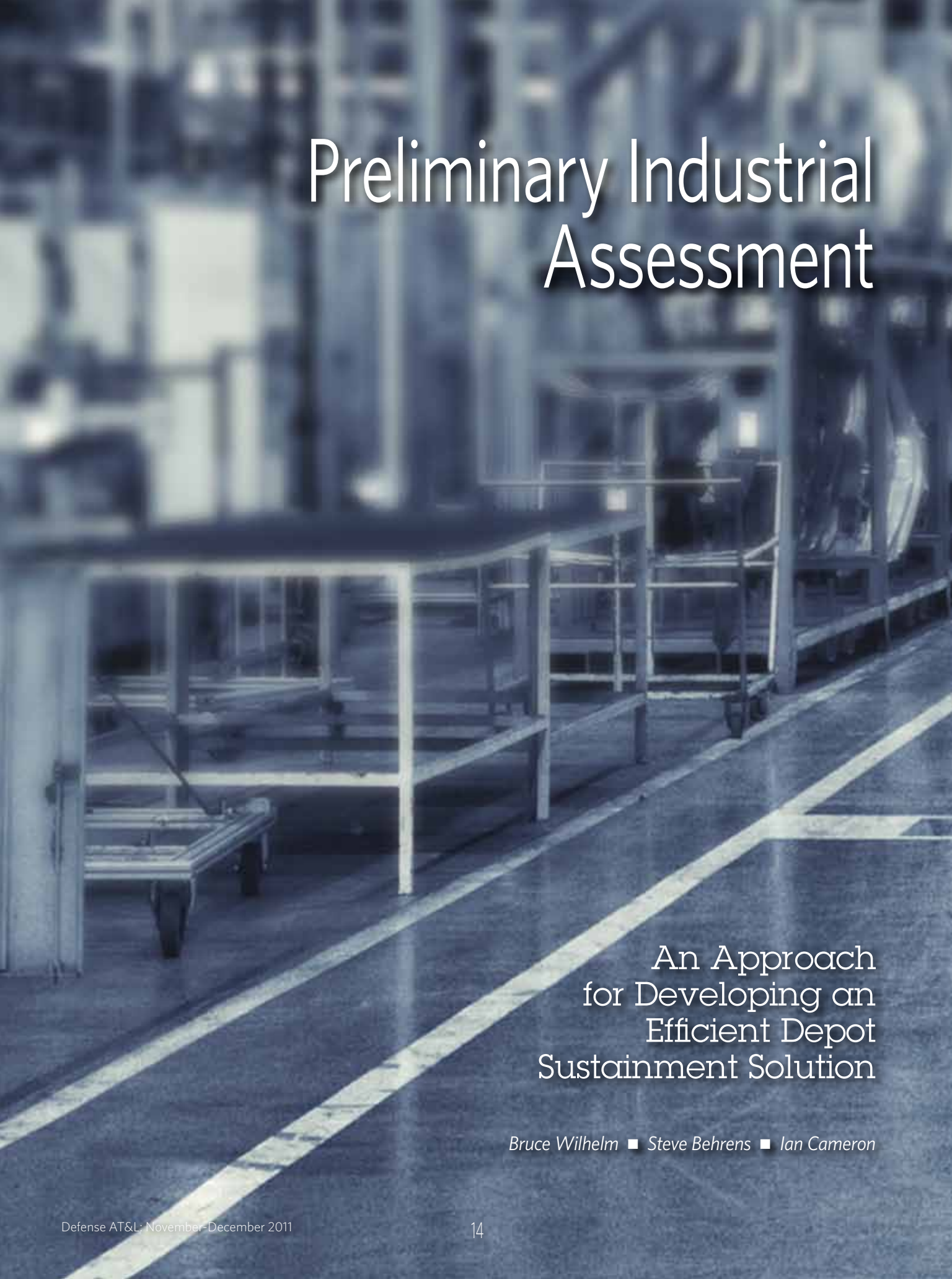
In our view, the elephant in the room is that to leverage any of these at scale, the DE must be generally competent to field large IT systems. Clearly, that is not the case.

The George Mason University Command, Control, Communications, Computers, and Intelligence (GMU C4I) Center is also a member of the N-ICE community of practice. On one hand, the GMU C4I Center has embraced the general PLA VP to address the issues of life cycle maintenance (LCM) for military MOSA. On the other hand, the center (and its partners) are applying OSS, Agile development, and Internet collaborative technologies according to their version of the VOTS business model. This approach considers LCM to be an end-to-end process that:

- Includes operational customers as partners in a continuous requirement capture → development/discovery of capability → T&E/V&V/certification → deployment feedback loop
- Recognizes that requirements for IA and Interoperability provide high barriers to entry for industry at large, add cost, and slow acquisition.
- Provides a virtual distributed, on line, low cost, non-proprietary Open Standard Test Framework (OSTF) that includes:
  - Configurable instance(s) of military PLA
  - Open source software development kits (SDKs) for IA and IoP components.
- Agile, OSS collaborative engineering environment allows/enforces continuously improving streamlined workflow across ecosystem of provider, consumers, and certifiers.

The N-ICE initiative, through the GMU C4I contribution described, aims to create an Einsteinian portal from the as-is, massive, serial, ponderous Defense IT acquisition process, to the to-be, lean, parallel, agile, process. In this case, "open" means open. Please join us.

The authors can be contacted at **cgunders@nps.edu** *and* **mpullen@c4i.gmu.edu.**



Preliminary Industrial Assessment

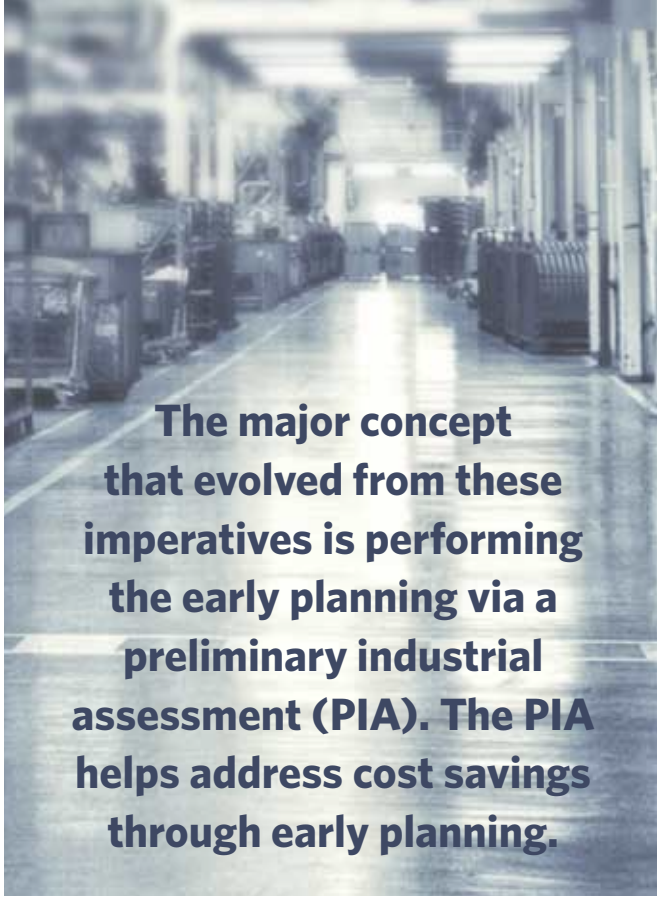
An Approach for Developing an Efficient Depot Sustainment Solution

Bruce Wilhelm ■ Steve Behrens ■ Ian Cameron

The Criticality of Need

Passionate discussions on federal spending and the national debt, along with political and outside pressures at the national level, will drive calls for further budget reductions. DoD will be required to take its share of these cuts. To that end, the Office of the Secretary of Defense (OSD) is under an edict for a $400 billion cut in security spending by FY 2023.

Wilhelm *is an aerospace engineer and military aviator with 33 years in depot/joint logistics support. He is Level III Life Cycle Logistics and APC certified.* **Behrens** *is an aerospace engineer with over 30 years working logistics and industrial policy for NAVAIR, Level III Life Cycle Logistics, and is a member of Defense Acquisition Corps.* **Cameron** *has 27 years in industry and joined NAVAIR in 2009, working logistics and industrial policy. He is Level III certified in Life Cycle Logistics and is a member of the Defense Acquisition Corps.*



The major concept that evolved from these imperatives is performing the early planning via a preliminary industrial assessment (PIA). The PIA helps address cost savings through early planning.

Immediate spending corrections are required in light of these budget reductions and the potential for greater cuts in the future. A significant allocation of the annual DoD budget is for the operations and support (O&S) costs of weapon systems, accounting for 60 percent to 70 percent of total ownership cost (TOC). Depot maintenance costs are a considerable portion of O&S costs. Therefore, there will be more pressure to establish the most efficient and effective depot maintenance solutions in order to reduce costs while maintaining warfighter readiness. This will require logical, risk-balanced, and defensible planning as early as possible in the acquisition lifecycle.

The Defense Acquisition Workforce is at a critical stage, as we change to processes and policies to achieve savings. The linkages between depot maintenance planning and the overall acquisition process have room for improvement; they *must* improve and become more efficient. To address these needs and challenges, NAVAIR has developed an initiative, along with associated depot maintenance planning tools for program managers.

As a means of accomplishing these goals, the NAVAIR Industrial Business Operations Office developed the "Strategic Planning Imperatives for Industrial Depot Maintenance" document (SPI for IDM) http://www.navair.navy.mil/logistics/library/SPI.pdf). It focuses on a specific set of activities, with an emphasis on early planning for depot maintenance. These imperatives, though developed for NAVAIR, could be applied across all Services, in that they address the generic industrial-maintenance sectors of source Service, interservice, and commercial with public private partnership (PPP) components. The major concept that evolved from these imperatives is performing the early planning via a preliminary industrial assessment (PIA). The PIA helps address cost savings through early planning. The components of the PIA (Core Logistics Analysis [CLA] and Source of Repair Analysis [SORA]) and strategic considerations enable programs to plan resource expenditures early, through timely decisions on depot maintenance posturing.

Leveraging Current Program Requirements

Industrial depot maintenance is a significant part of weapon system total ownership costs. It includes each Service's organic depots, the interservice agreements with one or more depots of the other Services, and commercial activities (with a possible performance based logistics [PBL] or PPP arrangement with a DoD organic depot). The program management team must analyze these options to determine the most effective and efficient solution for their program. Great emphasis must be placed on early planning to ensure the solution is implemented when required and as envisioned. This allows the program to establish cost estimates with greater confidence, determine all capability establishment requirements, establish accurate timing and funding requirements during the POM cycle, and reduce dependency on interim contractor support (ICS).

Depot sustainment planning must be part of and tied to the overall acquisition lifecycle framework model (titled the Integrated Defense Acquisition, Technology, and Logistics Life Cycle Management System [a.k.a. "the wall chart"]). Policies and instructions such as DoDI 5000.02 of 2008, section 805 of the FY2010 National Defense Authorization Act, and Dr. Carter's 2010 memo to acquisition professionals have identified the need for acquisition reform and for an association between acquisition and depot maintenance planning. Among these are requirements for a CLA and SORA to be accomplished prior to Milestone B; maximizing competition and making the best possible use of available DoD and industry resources at the system, subsystem, and component levels; maximizing value to the DoD by providing the best possible product support outcomes at the lowest operations and support cost; and the requirement for each major weapon system to be supported by a product support manager.

Depot maintenance planning is tied to overarching guidance as well as the guidance within the acquisition lifecycle framework model. Within NAVAIR, the path followed is the Navy's Systems Engineering Technical Review (SETR) process, a series of technical reviews performed throughout the acquisition lifecycle for assessing technical maturity, design maturity, and the ability to meet user requirements and expectations. These SETR reviews provide the valuable data points with information for performing depot maintenance solution planning. Other Services have similar processes when following the acquisition framework, collecting information and analyses for key events such as Systems

Functional Review (SFR), Preliminary Design Review (PDR), Critical Design Review (CDR), etc.

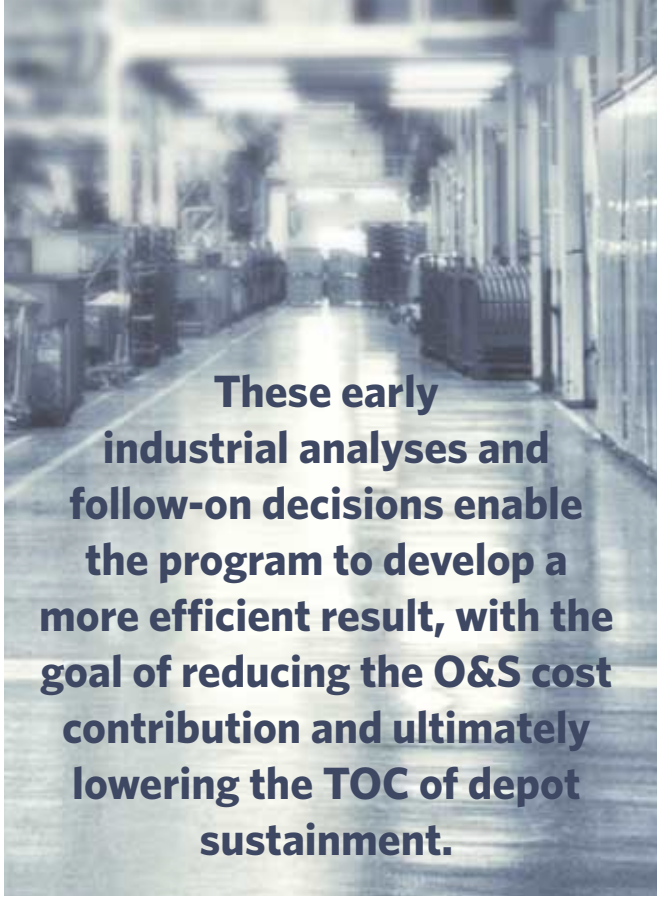
Naval Aviation's Source of Repair Analysis

To have a positive impact on depot maintenance and other associated costs (O&S and TOC), planning must be performed as early as possible in the acquisition lifecycle. This early depot maintenance solution planning allows greater fidelity in cost estimating, leading to accurate funding requests, and determination of the support infrastructure (e.g., technical manuals, training, facilities, depot plant equipment, etc.) It is understood that early on, all the detailed depot-level repairable (DLR) information is not available for analysis; therefore, the required decisions need to be made with the limited information available. The PIA process is a tool to assist the programs with the early planning, using available information. The focus is to provide the potential solutions that funnel to the final depot-level sustainment solution (Service, interservice, or commercial) based on these early analyses. To this end, the information and analysis developed as part of the PIA process is used as the entry point for performing the final Core analysis/advisory and entering into the Depot Maintenance Interservice (DMI) review process to obtain the Depot Source of Repair (DSOR) decision.

The first component of the PIA process, the CLA, is a non-economic analysis providing early awareness to the programs of Core capability required to be established at a public/organic depot. The CLA is an input to the final Core analysis, which provides the definitive decision on the systems, sub-systems, assemblies, sub-assemblies, and parts that must have organic repair capability established.

The second PIA process component, a SORA, is closely tied to the CLA. The analysis, performed in accordance with DoD policy, identifies an array of potential depot repair sites (organic and commercial) for consideration and review by the program in performing its early sustainment solution planning. The outputs from the SORA process are further analyzed, evaluated, and refined once DLR-level data is available to determine the definitive depot-level sustainment solution to be implemented.

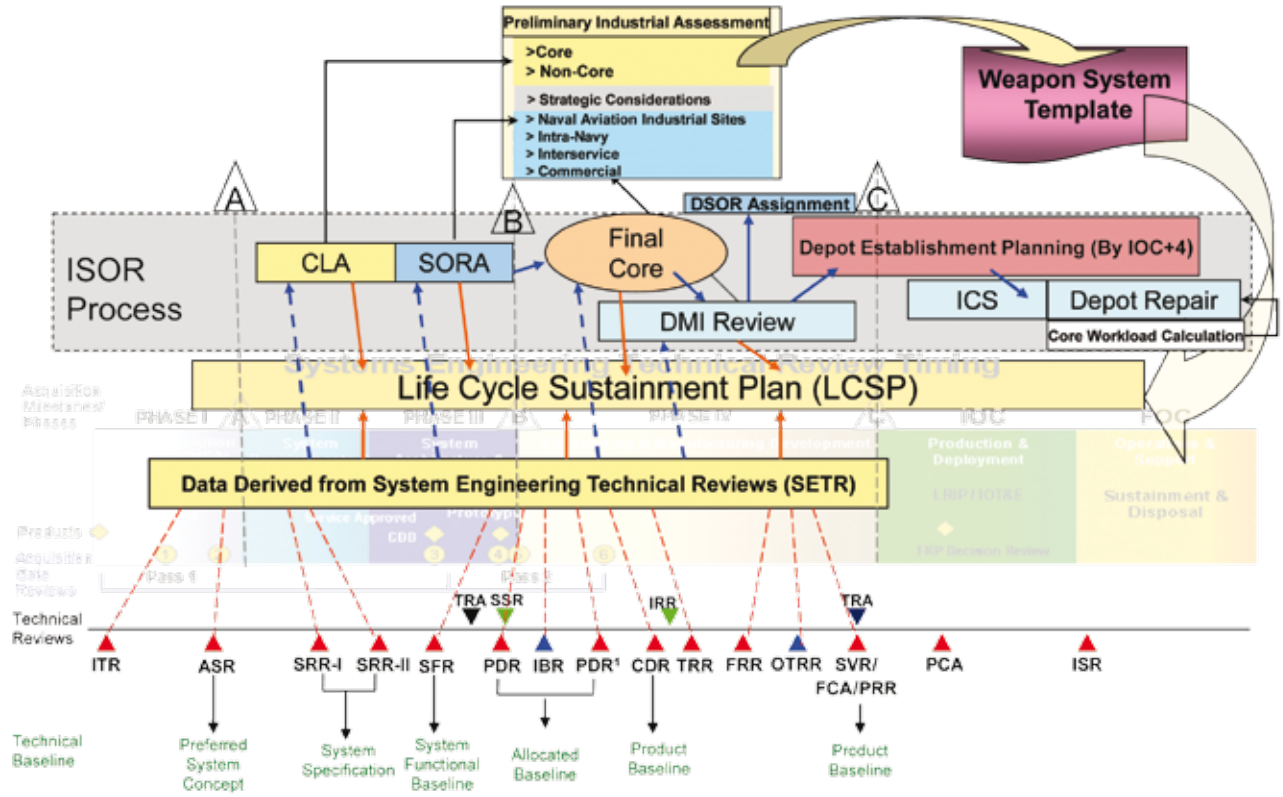
The last component of the PIA process is titled "Strategic Considerations." This area is focused on the special concerns that may lead to establishing organic capability where it would not otherwise be required. The analysis may include: a review of the criticality of the weapon systems mission, which might lead to a Service establishing organic maintenance capability for non-Core assets; a study of Title 10 considerations, including planning for 50/50 compliance (i.e. by directing more workload to organic depots); an action that potentially directs use of a Service Center of Industrial and Technical Excellence (CITE); and/or a strategic planning need for replacement organic workload when the supported weapon systems are sunsetting.



The PIA is a living analysis updated throughout a weapon system's lifecycle, and documented as an exhibit in the Life Cycle Sustainment Plan (LCSP). The PIA process leverages data from the SETR process technical reviews leading up to Milestone B of the acquisition framework. Graphical representation of the alignment of the two processes can be seen in Figure 1. By using the outputs from the SETR technical reviews, the program gains the advantages of early planning without needing to generate additional data and information. As stated earlier, the technical reviews being performed by NAVAIR under the Navy's SETR process are the same as those being done by the other Services moving through the acquisition lifecycle.

As the program moves through the acquisition lifecycle and performs the later technical reviews, more mature DLR identification information (e.g., part numbers, NIIN/NSN) is generated. This, along with PIA process output, is used to perform the final Core analysis/advisory and enter the DMI review process to obtain the DSOR decision. This final DSOR decision provides the authority to begin investing in the stand-up of the documented source (i.e., investment in capability stand-up **cannot** begin until the DSOR decision is finalized). The organic portion of the depot-level maintenance solution must be established no later than 4 years after Initial Operating Capability (IOC), and therefore the program benefits from the DSOR decision being made as early as possible. This is to accomplish the ultimate goal of having the depot-level maintenance capability stood up and in place to support the fielded weapon system to meet warfighter readiness requirement and minimizing, if not negating, costly ICS.

Figure 1. Industrial Depot Maintenance Management Process



PIA Is an Approach for Developing an Efficient Depot Sustainment Solution

The PIA process provides program managers the "what" and "why" of an early industrial analysis. Program offices determine how to implement industrial maintenance planning by using the tools provided in the SPI for IDM (including the PIA process) aligned to the SETR process. The end result of the PIA process should be early and timely identification of potential industrial depot maintenance capability solutions (to be reviewed, analyzed, and funded for implementation) that would support a program's overall readiness goals. The optimal result is balanced to include the use of Service specific, interservice, and commercial (through PBL solutions using PPP) depot-level sources without unnecessarily duplicating DoD depot maintenance capability and capacity. While other Services and agencies may not decide to call it a PIA, these processes should be easily adaptable to their requirements and goals, regardless of the terms used.

All industrial depot solution planning tools, including this PIA process, must be ultimately linked to the acquisition framework and the events and milestones within it. These early industrial analyses and follow-on decisions enable the program to develop a more efficient result, with the goal of reducing the O&S cost contribution and ultimately lowering the TOC of depot sustainment.

Effecting a Positive Change

The current and future plans are for large-scale reductions to overall DoD budgets. Industrial depot maintenance will be identifying efficiencies to support these reductions. While continuing to support readiness levels required by overseas contingency operations, the enterprise must become more efficient and effective. Each weapon system's acquisition life cycle will require fact-based, accurate, risk-balanced depot maintenance solution planning and decisions. The potential solution must then be analyzed and refined by information from technical reviews during the acquisition cycle as the design matures and stabilizes. By supporting and applying the recommendations in the *Strategic Planning Imperatives for Industrial Depot Maintenance 2010-2017*, including successfully performing an assessment such as the NAVAIR PIA process as early as possible using the SETR data, program managers gain greater leverage for performing planning, which helps maximize depot maintenance effectiveness and optimize investments.

Although the SPI for IDM was developed for Naval aviation, everything in it and the PIA process could be adopted for use by other Services or agencies. For readers who would like additional information on these or other related depot processes, please contact NAVAIR's Industrial Business Office at 301-757-8427.

The authors can be reached at **bruce.wilhelm@navy.mil, steven.behrens@navy.mil**, *and* **ian.cameron@navy.mil.**

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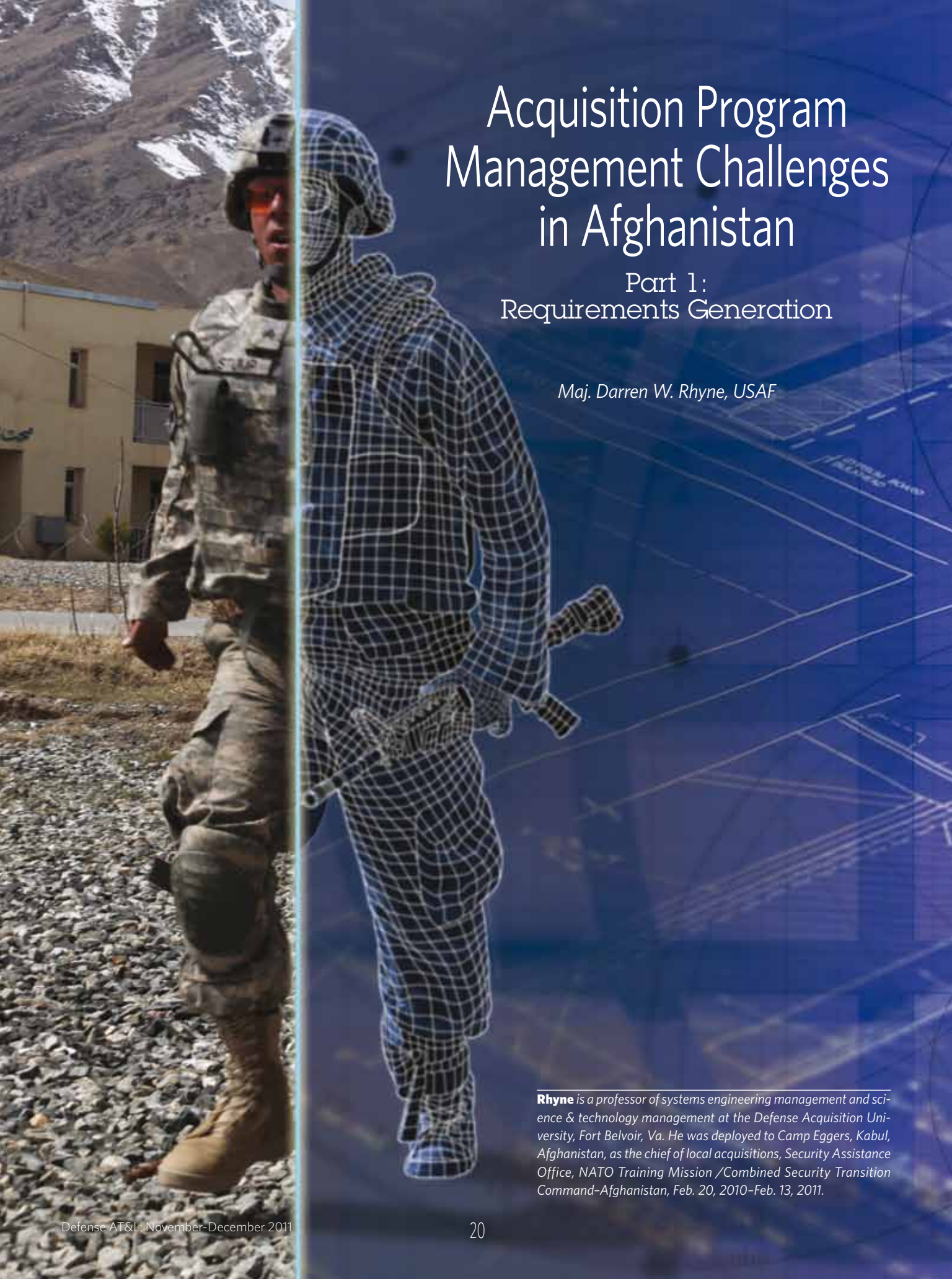


Acquisition Program Management Challenges in Afghanistan

Part 1: Requirements Generation

Maj. Darren W. Rhyne, USAF

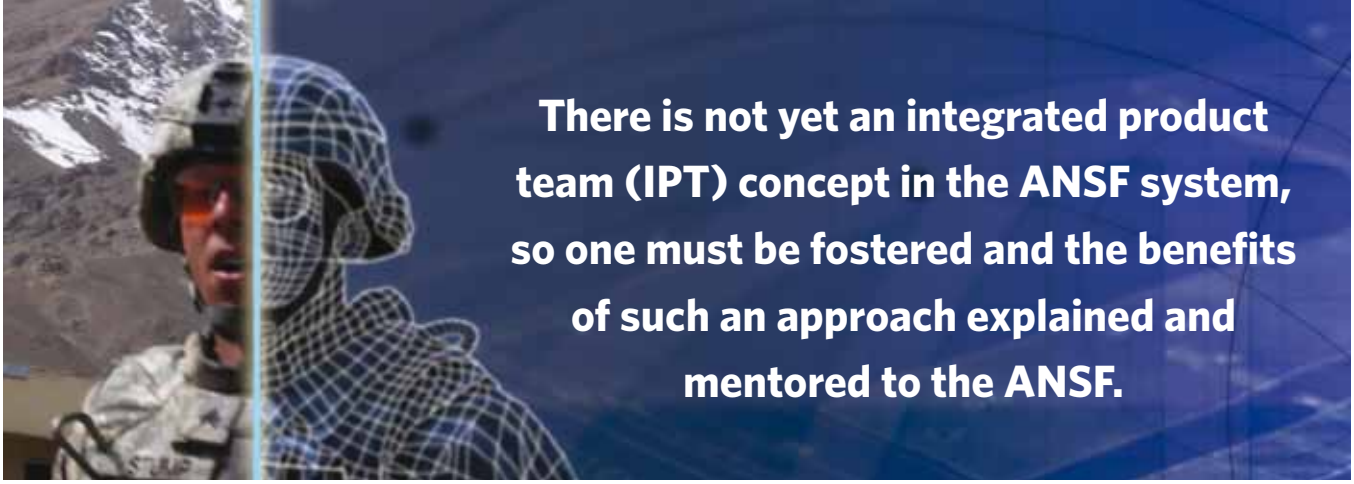
Rhyne *is a professor of systems engineering management and science & technology management at the Defense Acquisition University, Fort Belvoir, Va. He was deployed to Camp Eggers, Kabul, Afghanistan, as the chief of local acquisitions, Security Assistance Office, NATO Training Mission /Combined Security Transition Command–Afghanistan, Feb. 20, 2010–Feb. 13, 2011.*

Deployed program management of local acquisitions in Afghanistan presents challenges both similar and dissimilar to those experienced in the United States. One major challenge is requirements generation with Afghanistan National Security Forces (ANSF) and those of the Coalition advisors. This article is the first of two parts that highlights challenges and provides lessons for deployed program managers to use when conducting acquisition programs beyond simple commercial-off-the-shelf commodity procurements with host-nation vendors in a combat environment. A separate article will discuss the challenges of procuring defense items from the Afghanistan vendor base.

Overcoming the requirements generation challenges has been the primary focus of the Security Assistance Office–Afghanistan's (SAO-A's) 15-person Local Acquisitions Office since early 2010. The SAO-A functions under the three-star NATO Training Mission–Afghanistan/Combined Security Transition Command–Afghanistan (NTM-A/CSTC-A), charged with training and equipping the components of the Afghanistan National Security Forces (ANSF). NTM-A/CSTC-A and the three-star International Joint Command (IJC), which conducts counterinsurgency and security operations in concert with the ANSF, are the two major commands under the International Security Assistance Force (ISAF), led at the time by Gen. David H. Petraeus.

Preparation for deployed program management and procurement should start at the home station. Those who will be involved in making local purchases or overseeing service and construction contracts should obtain their Contracting Officer's Representative (COR) certification training prior to deployment. Due to the low Internet bandwidth available at most deployed locations, not to mention the deployed work load, I recommend taking the four online training courses at the home unit. These courses are: CLM 003, *Ethics Training for AT&L Workforce* (or Service equivalent); CLC 106, *COR with a Mission Focus*; CLC 206, *COR in a Contingency Environment;* and *Combating Trafficking in Persons* (CTIP). Three of these courses (CLM 003, CLC 106, and CLC 206) are available at the Defense Acquisition University (DAU) Atlas Pro website (https://learn.dau.mil/html/login/login.jsp). To sign up for training, click the "I Need Training" link on the left side of the web page, which will direct the applicant to his/her Service training application site to complete the registration process. The CTIP course is normally part of the required pre-deployment training for each Service member.

Those deploying to Afghanistan should read the Afghan First Policy documents that explain the effort to rebuild the Afghan economy and industrial base while contributing to the counterinsurgency (COIN) campaign. A bibliography of these documents can be found at the end of this article, starting with the National Defense Authorization Act for Fiscal Year 2008 (Public Law 110-181), Section 886, "Enhanced Authority to Acquire Products and Services Produced in Iraq and Afghanistan." The premise of the Afghan First Policy is to purchase as much as possible from Afghan companies to support the Afghanistan National Security Forces (ANSF), composed of the Afghanistan National Army (ANA) and the Afghanistan National Police (ANP). A special Title 10 Department of Defense (DoD) appropriation called the Afghanistan Security Forces Fund (ASFF) is used by deployed program managers to purchase commodities and life support, construction, and other services from Afghan-based companies. The ASFF also is used by the SAO-A to procure Major End Items through the foreign military sales process managed by the Defense Security Cooperation Agency (DSCA). For locally procured items, the SAO-A Local Acquisitions Office takes the Afghan First Policy one step further to buy as many prod-



There is not yet an integrated product team (IPT) concept in the ANSF system, so one must be fostered and the benefits of such an approach explained and mentored to the ANSF.

ucts from Afghan vendors who actually make them. Those are the procurements most challenging to deployed program managers and will be the focus of the remainder of this article.

One of the first challenges the deployed program manager faces is generating requirements, both within the Coalition and with the ANSF leadership. The dynamic security environment leads to many changes in training and fielding plans for the ANSF. The Coalition planned to grow the ANA from 134,000 to 171,000 personnel and grow the ANP by roughly 25,000 personnel by October 2011. This included forming brand new organizations and greatly expanding those approved in 2010, such as the Afghanistan National Civil Order Police (ANCOP), the Afghanistan Public Protection Force (APPF), the Afghanistan Local Police (ALP), and the ANA Commandos. For the SAO-A Local Acquisitions Office (SAO-A/LA), this meant developing new uniforms and outfitting the ANSF units with dozens of Organizational Clothing and Individual Equipment (OCIE) items without the benefit of having clothing, footwear, and other OCIE experts in the deployed office. The ANSF also do not have such experts and neither do they have a materiel command organization comparable to that in the DoD.

Therefore, the SAO-A/LA team reached back to DoD organizations with this expertise in the U.S., such as the Natick Soldier Research Development and Engineering Center (NSRDEC) and Defense Logistics Agency Troop Support Command in Philadelphia (formerly Defense Supply Center–Philadelphia, DSC-P). These organizations supplied the SAO-A/LA team with U.S. government specifications for uniforms, boots, and other OCIE items so that they could be included in solicitations to Afghan industry to have the items made in-country. NSRDEC representatives actually traveled to Afghanistan on two occasions to help the SAO-A/LA team assess the Afghan clothing/textile industry and finalize specifications. Their help was invaluable in helping implement not only Afghan First but actual Afghan Made initiatives.

Another challenge in generating requirements lies in defining them in objective versus subjective terms, and then testing them prior to full-rate production. ANSF personnel typically define quality in subjective terms, such as "high quality" or "durable," or based on where the item is made, such as "Turkish quality" or "Iranian quality," rather than in objective, measurable terms. These subjective terms are actually part of item nomenclatures in the ANSF logistics inventory management system and incorporated into the culture of the Afghanistan public and industrial base to describe their goods in their commodity price lists. Therefore, obtaining meaningful, measurable requirements from the ANSF for which the items are being developed and procured is very challenging. With the help of Air Force Capt. Phil Bernal, an advisor to the ANP Logistics and Procurement departments, I developed and conducted a basic requirements generation training seminar for 10 ANP item managers in December 2010. However, it will take time to change this subjective standard of measurement in both Afghan government and industry, and show them the life cycle cost benefits of defining and paying for objective, measurable quality.

In addition to difficulty defining requirements in a way they can be measured, there are no national government or commercial standards or testing capabilities for defense-related articles in Afghanistan. The nearest Underwriters Laboratory is in India. Counterfeit goods and components are abundant but not easily distinguished from the actual name brand. Many Afghan vendors claim to be able to supply almost any commodity needed, which calls into question their ability to do any one thing really well or actually make anything in Afghanistan. Therefore, SAO-A/LA sends vendor samples on new contracts to DoD organizations such as DLA or NSRDEC for laboratory testing. For initial operational testing of clothing items, SAO-A/LA coordinates with the Coalition and the ANSF to have some of the ANSF training sites use the items during their basic warrior training courses. This approach has the advantages of the test sites being close to the SAO-A/LA program management team in Kabul, a semi-controlled test environment over several weeks of practical use, inspecting and collecting the test items after training and before fielding, and negating risk to real security operations in case of unexpected product or component use failures, manufacturing defects, or design flaws.

Another challenge for generating requirements involves the high levels of approval required and the corresponding lack of delegation of authority and empowerment in the ANSF leadership. Design decisions that would be made at the one- or two-star level in the DoD (Acquisition Category III or lower)

may have to go the deputy minister of Defense or Interior, or the actual minister, for approval prior to enactment. Thus, adequate staffing time must be built into the development schedule and fielding date expectations managed, especially among the Coalition leadership used to more expedient resolution of such matters in the DoD or NATO nations. It is also a very good idea to identify the approval authorities required on both the ANSF and Coalition sides when a new or improved product is to be developed.

Requirements generation in Afghanistan also presents challenges in obtaining end user (ANSF) input and feedback. Major operational command planning staffs, in which requirements managers reside in the DoD system, don't have a corollary in the ANSF system. Instead, the requirements managers are usually found in the logistics staffs, under the general staff chief of logistics (GSG4) in the Ministry of Defense and the deputy minister for administration and support in the Ministry of Interior, with no direct ties to the actual end users. The ANSF cultural environment also tends to restrain personnel in one chain of command from talking to those in another, even if just for technical interchange discussions at the action officer level. There is not yet an integrated product team (IPT) concept in the ANSF system, so one must be fostered and the benefits of such an approach explained and mentored to the ANSF among the functional areas normally found on such Requirements IPTs in the DoD.

On the NTM-A/CSTC-A side, the Directorate of Logistics (CJ4), ministerial development advisors, and SAO-A/LA, not an operational headquarters element, develop most of the requirements with their ANSF counterparts. SAO-A/LA, as the commodity acquisition program management office, has therefore facilitated such cross-functional discussions among ANSF staffs and actually traveled to meet with ANSF end users to directly obtain their input and feedback on new or improved items under development. Again, such travel and meetings should be factored into requirements development timelines and leadership expectations managed accordingly.

Afghan industrial base constraints and the ANSF perception of them also present challenges for developing requirements. The typical ANSF requirements development process for a new or improved item is to find similar items at the local bazaars and have vendors bring in samples, usually imported, for approval by a small committee. This approach constrains the requirements to those of the available items, thereby jumping to a technical solution without the benefit of first developing the operational concept, strategy to task relationship, functional needs, and non-materiel solution analyses typical of Western requirements development.

There are also no ANSF organizations that do non-materiel solution analyses to see if a materiel development is even required, or to ascertain the impacts of a materiel development, if warranted, on non-materiel facets of the ANSF. In the DoD system, the non-materiel solution analysis examines the DOTMLPF, or Doctrine, Organization, Training, [existing] Materiel, Leadership and Education, Personnel, and Facilities potential solutions first before a Materiel Development Decision is made. Non-materiel solution analysis also assesses

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Two valuable web resources:

- Peace Dividend Trust: http://afghanistan.buildingmarkets.org/
- Afghan First.Org: http://www.afghanfirst.org/

The GIF usually wants to get his ANSF partner some new, distinct or improved item, in an unreasonable amount of time, with no funding provided, and/or with little regard for many of the requirements challenges previously outlined.

or projects the impacts of that materiel development on the DOTMLPF areas as the requirements evolve and the development progresses. Considering the ANSF's typical subjective definition of requirements described earlier, combined with the lack of non-materiel solution analysis, definition of operational requirements, national standards, and test capabilities, generation of requirements with and within the ANSF is challenging to say the least.

Another challenge in developing requirements with the ANSF is documenting the requirements package and maintaining configuration control over it. In the DoD system, the requirements package from the Joint Capabilities Integration Development System (JCIDS) includes a summary of the operational requirements, non-materiel solutions analyses described above, the potential materiel solutions, and other "cradle to grave" analyses. While such extensive documented analyses are probably not feasible for most local procurements of simple Class IV commodities for the ANSF, such comprehensive analyses and documentation are warranted for development of more complex, high-visibility items. This is especially important for items intended to be locally procured from Afghan vendors to foster creation and expansion of their manufacturing base while properly equipping and outfitting the ANSF. More importantly, mentoring the ANSF to conduct such requirements development and procurements for themselves is extremely important so that they will one day be able to conduct such actions themselves.

Documentation of requirements and decisions made during their development are also crucial to maintain continuity among the ever-changing cast of Coalition personnel whose tours vary from six months to one year in length and whose positions may be filled by those operating outside their normal career field. For example, the SAO-A/LA OCIE Team grew from one to six personnel within the year 2010, with half on six-month tours, all but two having no actual acquisition program management experience or training, and none having any prior experience in OCIE requirements development or program management. Documenting progress and decisions made is vital not only for the PM team's continuity but also for PM team to indoctrinate the ever-changing Coalition advisor and logistics personnel on the overall item development team. While this is also crucial for CONUS-based acquisitions, it is doubly important in the deployed environment.

It is here in the requirements documentation process that the deployed acquisition program manager must beware of the "good idea fairy" (GIF). The GIF is not native to Afghanistan but is usually a well-intentioned Coalition member. The GIF usually wants to get his ANSF partner some new, distinct or improved item, in an unreasonable amount of time, with no funding provided, and/or with little regard for many of the requirements challenges previously outlined. The GIF can also insist that his project be placed above the huge work load already put on the small deployed program management (PM) team by approved projects. New projects or item improvements that bypass the PM team and go straight to Coalition and/or ANSF leadership can result in a re-prioritization of the PM team's work load and funding without due consideration of the entire requirements inputs and outcomes. Similarly, GIF changes to requirements that are not documented and approved by the Coalition and ANSF leadership can cause much consternation and confusion in the PM team, who might be the last to hear about such changes, approved or not, or to have a chance to analyze and support or rebut them.

Therefore, each requirements package should be configuration-controlled by a specific member of the PM team. Requirements team members should be advised up front that only the approved version of the requirements document package will be acted upon by the PM team until the senior leaders in the ANSF and Coalition approval chains direct otherwise.

In summary, a program manager can face many challenges when trying to develop an acquisition program to procure a new or improved product while deployed in Afghanistan. Improper requirements generation can start a program down the wrong path and cost much time and money, both of which are valuable commodities to the small deployed program management team. The deployed PM must work to foster teamwork within the ANSF and Coalition to define requirements in objective, not subjective, terms. Those requirements must be documented for continuity and configuration-managed to prevent unauthorized changes from well-meaning individuals. Once those hurdles are overcome, the PM then faces the daunting challenge of finding Afghan vendors who can actually manufacture the items to the quality defined in those documented requirements. But that is the subject of another article.

The author can be contacted at **darren.rhyne@dau.mil.**

Acquisition Reform as Performance Art

Re-forming Acquisition Reform

Ross A. Jackson, Ph.D.

Silence falls upon the audience as the houselights dim. Three figures appear center stage. Demanding greater accountability, an aggravated politician lambastes bureaucrats for operating in a maze of outdated policy. A baron of business extols the virtues of a market economy and explains that with stable requirements, industry could deliver cutting-edge weapon systems on schedule and budget. In response, a contrite, high-ranking military member acknowledges past mistakes but focuses attention on the lessons learned. The military member explains they are proactively reforming their acquisition processes based on these lessons. The three characters continue to speak, now inaudibly. The curtain falls. The audience sits in the bewildered confusion often accompanying performance art.

Defense acquisition outcomes are the result of a complex combination of actions and inactions by members of Congress, the military Services, and the defense industry. Collectively, these elements comprise a major part of what one might call the defense acquisition system. Yet acquisition reforms, when implemented, tend to focus narrowly on changing the internal acquisition processes of the military Services. This approach has failed to produce substantial improvements. If we are to achieve significant improvements, acquisition reforms should address

Jackson *is a branch chief in Headquarters Air Force Materiel Command. He teaches economics and management at the University of Phoenix Cincinnati campus.*

the broader defense acquisition system. Simply modifying the military's acquisition processes is inadequate to the task of generating actual improvements. It is time to consider seriously the prospect of re-forming acquisition reform.

There is no shortage of defense acquisition reform efforts. In fact, it seems that each decade contains its own major reform effort along with a smattering of lesser initiatives. A list of better-known acquisition reforms includes the Fitzhugh Commission in 1970, the Packard Commission in 1986, Perry's Acquisition Reform in 1994, and the Defense Acquisition Performance Assessment Project in 2006. These reports focus primarily on improving the cost and schedule performance of defense programs. While each study provides a unique set of recommendations, there is a great deal of consistency among the proposed solutions. In the most general form, these recommendations tend to suggest improving acquisition outcomes requires that military Service members do more good things and stop doing as many bad things.

Because these standard recommendations lack novelty, it is all too easy to view them superficially. Consequently, it appears plausible that the suggested actions could improve defense acquisition. In other words, because the recommendations fit so easily in to the existing paradigm of defense acquisition reform, one is able to accept them without much (if any) critical thought. However, the frequency of these studies makes one doubt they substantially improved acquisition outcomes. Studies focused on defense system cost growth further suggest these reforms did not quite deliver.

In a 1993 RAND study, Drezner and his team analyzed the impact of defense reforms from 1960 to 1990 on weapon system cost growth. Their results indicate no significant change in performance. In 1996, Christensen's team of analysts narrowed the focus to the impact of the Packard Commission by analyzing 269 defense acquisition contracts from 1988 to 1995. The results of this study suggest performance on development contracts worsened significantly. A more recent RAND study, led by Arena in 2006, provided some positive but ultimately inconclusive results regarding changes in defense system cost growth. Collectively, these studies call into question the impact of prior reforms and suggest it is time to address the broader acquisition system rather than simply continue modifying the military's acquisition processes.

This assessment of the situation is not without its critics. Apologists for acquisition reform often contend the consistency in recommended solutions and the lack of discernable improvements are both the result of a failure of the military Services to implement the reform in practice. This view is not without some merit. It is interesting to think about when this argument is used, by whom, and for what purpose. This type of defense of acquisition reform is often employed by those leading the current wave of acquisition reform as a means to convince a critical audience that somehow this iteration of reform will be different. Inevitably, somebody in the audience is brave enough, foolish enough, or close enough to retirement to ask what makes this iteration different.

Inevitably, there is somebody in the audience who is brave, foolish, or close enough to retirement to ask what makes this iteration different.

Reform leaders typically provide an answer in two parts: First, the previous reforms did not have the current leader in charge of the effort. Second, this time we have the full support of senior leadership. These justifications tend to work the first time one hears them. Subsequently, one understands the first portion is a classical management fallacy in which one overestimates personal ability. The negative consequences of such an overreliance on personal ability are even more likely to occur considering the manager is only part of one of the world's largest bureaucracies. It is difficult to imagine any large-scale, organizational effort for which the second claim is not a necessary condition. This creates an interesting scene in which the position is potentially accurate and not altogether irrelevant, but too weak to inspire much confidence that future reform efforts will actually be implemented.

One might think the motivation behind the recommendation to take a systems approach is based on a desire to shift blame away from the military. After all, increasing the aperture will defuse the focus given to any one group. While broadening acquisition reform to address the roles played by members of Congress and the defense industry does produce this result, it is merely a consequence and not the intent of the recommendation. To be clear, the military Services are ultimately responsible for the acquisition outcomes of defense programs. Nevertheless, the Services are perhaps too obvious a place to focus attention. Provocatively, it is precisely because they seem like the logical place to start that one should look elsewhere. However, the temptation to do something (almost anything) might be too great. It is understandable why acquisition reforms focus primarily on military processes. Since these processes are so well defined, they lend themselves to modification. Unfortunately, just because the processes lend themselves to modification does not mean these modifications produce significant improvements.

One conceptual error with the dominant perspective is it presupposes the military Services, while responsible, control acquisition outcomes. In reality, defense program managers merely influence certain aspects of the acquisition process. This influence interacts with the influences of members of Congress and the defense industry. Improving acquisition performance requires understanding and subsequently modifying the underlying structure of this dynamic web of complex interactions. Like the pedestrian list of common acquisition reforms, even this recommendation to take a systems approach is not altogether new. Some acquisition reform studies and research articles address elements of this concern. Understanding these attempts at reforming the overarching acquisition system helps set the stage for a further interrogation of why defense acquisition reform efforts fail to produce meaningful improvements.

The 2006 *Defense Acquisition Performance Assessment Report* certainly influenced the way acquisition professionals discussed acquisition reform, even if it has not yet fundamentally changed actual acquisition outcomes. The use of "big A" acquisition (the management systems) and "little a" acquisition (the military's processes) became part of the insider's lexicon. Even today, people refer to "big A" acquisition issues. However, while significant in a certain rhetorical sense, in implementation the focus appears to have reverted to the military's acquisition processes. Perhaps the pressure to do something compels military members to reform the only portion of the system under their immediate control, even when there is little chance this change will improve performance. Under such a construction, the reform actions are more symbolic and rhetorical than constructive.

Deborah Frank addressed the overarching political concern in her 1997 article "A Theoretical Consideration of Acquisition Reform." Frank recognized that "far more radical" change would be required, one that "basically alters the relationship between the political system and the acquisition process," to produce significant and meaningful changes in acquisition outcomes. However, such radical change is unlikely given that the defense acquisition system, even with its occasional public failure, works at what must be considered an acceptable level of performance. More directly, Frank explained, "a political system accustomed to muddling through will probably engage in radical reform only in response to massive failure. And the fact is the failures of the acquisition process tend to appear on the margins." That the acquisition failures, when they emerge, are of insufficient quantity or magnitude to warrant significant change to the defense acquisition system does not mean one is able to ignore them. These failures form a basis for rhetorical and symbolic maneuvers by members of Congress, the military Services, and the defense industry.

Regarding the numerous attempts at acquisition reform and the consistent lack of discernible improvements in performance outcomes, the Center for Strategic Inquiry's Jeff Dafler observed:

> "If reform fails, does anybody care? The big question about outcomes in the organizational context is: What are the consequences of the success or failure of reform? It seems there are political consequences to failing to call for reform, which means there are organizational consequences for failing to engage in reform. History, however, seems to indicate that there are no consequences for failing to actually achieve the stated aims of a given reform initiative. So then, you have politicians engaging in discourse that conveys outrage over cost overruns, senior officials at the Pentagon engaging in discourse showing their determination to stop them, and defense personnel (apparently) engaging in discourse to prove their commitment to action. Based on the outcomes, however, one is only left to conclude that the politicians are not actually outraged, Pentagon leadership is not really determined, and defense personnel are not all that committed. They are all only pretending."

Changing the wording of this conclusion slightly to be more consistent with the motif developed in this article, perhaps they are all only engaged in the performance art of acquisition reform. A performance where the roles are too tightly scripted, the actions too repetitive, and the outcome too predictable. In other words, the performance contains all the inherent flaws of a sequel.

It is time to focus attention on the broader defense acquisition system, rather than the military's acquisition processes. Informed by this broader perspective, we should decide either to do substantially more by actually changing the structural causes for the dynamics among Congress, the defense industry, and the military Services, or, interestingly, to do considerably less by ceasing to pursue acquisition reforms that too narrowly focus on the military's acquisition processes. It is worth noting in passing that attempts at reform are not free. Pursuing reforms entails costs in terms of both time and effort. This has important implications for the current wave of acquisition reform, with its densely encoded pursuit of greater "efficiency." If reforms to the military's acquisition processes fail to significantly improve performance it would be more efficient to allow the acquisition system to operate at the given, albeit uninspiring, level.

More than 40 years of acquisition reforms combined with relatively consistent performance data are sufficient to question the efficacy of this script. If there is a real defense acquisition problem (which is suspect), the solution likely requires us to re-form acquisition reform to address more fully the broader defense acquisition system. If there is not really a problem, these reforms are inefficient as well as ineffective. In either event, the data suggest we should stop tweaking the military's acquisition processes in hopes of substantially improving acquisition performance unless these refinements are part of a much larger acquisition system reform. That is, unless one finds playing a role in acquisition reform as performance art intrinsically rewarding or otherwise unavoidable.

The author can be reached at **ross.jackson@wpafb.af.mil.**

Increasing Participation of Wounded Warriors and Individuals with Disabilities

Finding and Recruiting Schedule A Candidates

Matthew Tropiano

In fiscal year 2009, employees with disabilities were less than 1 percent of the federal government workforce—a decline since FY 2000 and short of the 2 percent goal set by the Equal Employment Opportunity Commission (EEOC)—a goal that only 11 federal agencies have reached.

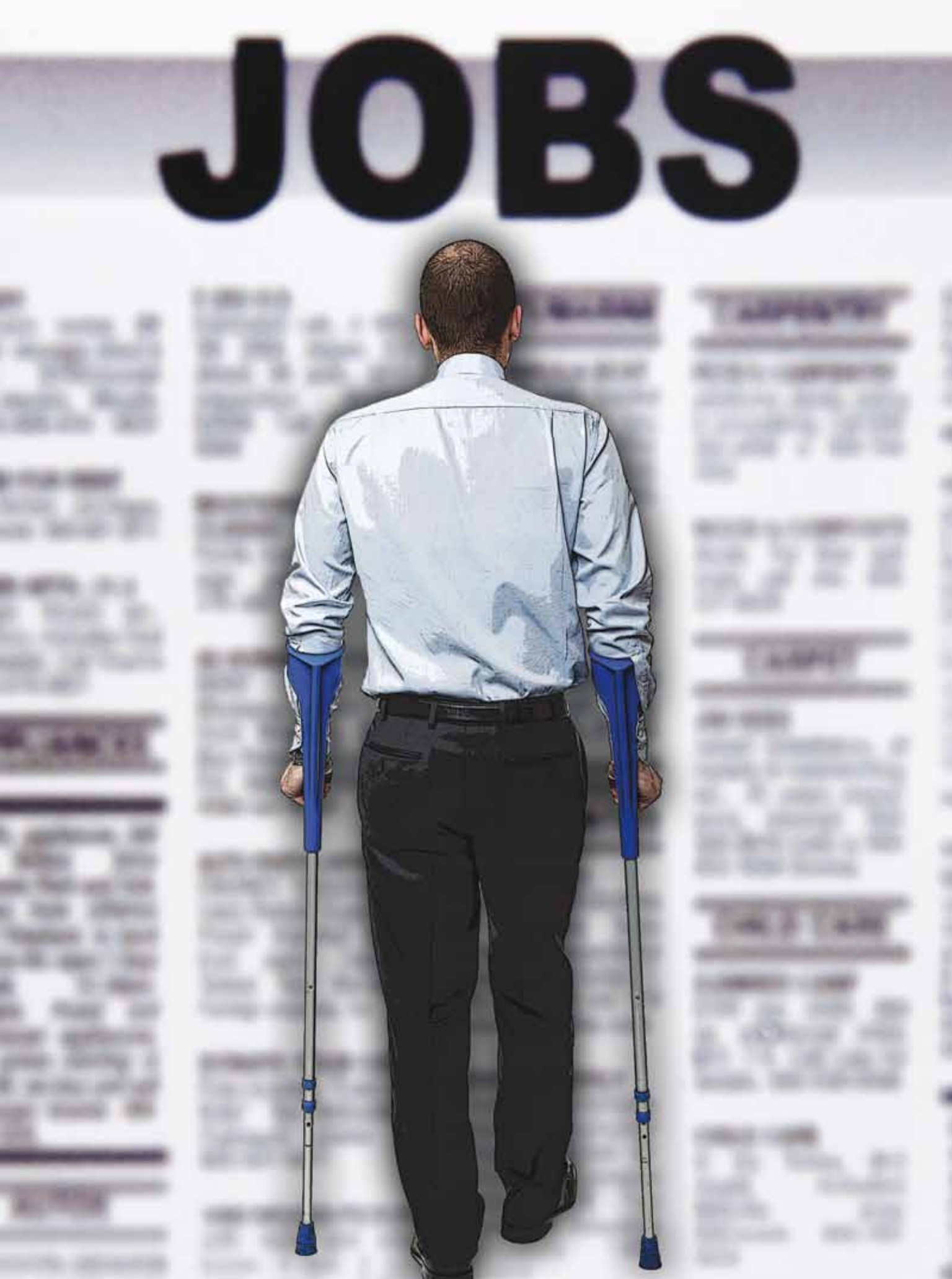
To remedy this, President Obama issued Executive Order 13163 on July 26, 2010. It directs the head of the Office of Personnel Management (OPM), in consultation with the secretary of Labor, the chair of the EEOC, and the director of the Office of Management and Budget, to develop mandatory training programs. It also commits the government to hiring 100,000 individuals with disabilities in the next 5 years.

Enabling the success of Executive Order 13163 is the Schedule A hiring authority, which allows agencies to hire or appoint persons with disabilities using a much shorter process than the usual 6-9 months. Depending on security and other pre-employment requirements, using Schedule A authority can shorten the hiring time to anywhere from 2 weeks to 2 months. The regulations guiding this instruction can be found in the Code of Federal Regulations (CFR). The citation is 5 CFR § 213.3102(u).

Why Use Schedule A?

Because of the low percentages of individuals with disabilities in the federal government compared with the civilian labor force, individuals with disabilities are an untapped source of excellent applicants. Schedule A has greatly facilitated the process of hiring an individual with a disability; no public notice is required, and the amount of time to perform the usual human resource related procedural steps is greatly reduced or avoided. Consequently, Schedule A can greatly reduce the time necessary to hire a well-qualified candidate. In

Tropiano *is the corporate recruiter and disability/wounded warrior program manager for the Navy Facilities Engineering Command. He began working for the Navy as a Presidential Management Fellow in 2001 and has master's degrees in business, religious studies, and public affairs.*


JOBS

Schedule A can greatly reduce the time necessary to hire a well-qualified candidate. In addition, the federal government's growing emphasis on telework will dovetail well with the needs of many applicants with disabilities.

addition, the federal government's growing emphasis on telework will dovetail well with the needs of many applicants with disabilities. Finally, agencies using Schedule A will not have to clear Priority Placement Program (PPP) lists, Re-employment Priority List (RPL) lists, or other mandated priority hiring lists prior to using Schedule A. In short, when a manager uses Schedule A, he/she is not required to go through the certificate process; he/she can choose to pick the Schedule A candidate.

Who Qualifies to Be a Schedule A Candidate?

Schedule A candidates are people with severe intellectual, physical, or psychiatric disabilities. Disabled veterans with disability ratings of 30 percent or more from the Department of Veterans Affairs also meet the Schedule A requirements. To be Schedule A certified, an applicant needs only a letter from his/her doctor, rehabilitation specialist, or another government entity stating that he/she has a severe disability and can do the job for which he/she has applied.

Resources for Hiring

Naval Facilities Engineering Command (NAVFAC) is the systems command that delivers and maintains quality and sustainable facilities, acquires and manages capabilities for the Navy's expeditionary combat forces, provides contingency engineering response, and enables energy security and environmental stewardship. NAVFAC, with locations across the United States and in countries around the world, currently employs 996 individuals with disabilities, including 799 wounded warriors. From 2010 to 2011, the number of wounded warriors working at NAVFAC increased 21.8 percent, and the number of individuals with disabilities working at NAVFAC increased 12.5 percent. NAVFAC Southeast, NAVFAC Midwest, and NAVFAC Southwest increased their wounded warrior populations 21 percent, 23 percent, and 24 percent, respectively. NAVFAC Headquarters increased its wounded warrior population by 50 percent, and NAVFAC Hawaii increased its wounded warrior population by 56 percent.

There are several excellent sources of qualified wounded warrior applicants. The Navy Human Resource Service Centers (HRSCs) can provide hiring managers and recruiting personnel with regular updates of wounded warriors Schedule A candidates including their desired occupation, educational background, qualifications, and geographical field of interest. These resumés can be accessed by sending an e-mail to the HRSC's point of contact. NAVFAC has hired several wounded warriors through this source. For wounded warrior lists from HRSC–Southwest in San Diego, e-mail Dennis Eley at dennis.eley1@navy.mil; for wounded warrior lists from HRSC–NE in Philadelphia, e-mail Jason Simms at jason.simms@navy.mil; for wounded warrior lists from HRSC-E, e-mail Corey Young at corey.young@navy.mil; and for wounded warrior lists from DC Capital Area Region, e-mail Jenna Sarrafin at jenna.sarafin.ctr@navy.mil.

The Office of Personnel Management's (OPM) Shared Register of Candidates with Disabilities is a database of Schedule A candidates. OPM, in collaboration with the Chief Human Capital Officer (CHCO) Council, established a contract to populate a shared register of individuals with disabilities who have an interest in working for federal agencies and who satisfy the requirements of positions federal agencies are frequently required to fill. On a monthly basis, a minimum of 50 individuals are recruited, screened, and directed to the shared register. This regularly updated register is available on a biweekly basis for anyone who requests it. For more information on OPM's Shared Register, e-mail Sherry Homme at shomme@benderconsult.com.

Equal Opportunity Publications (http://www.eop.com/expos.php) coordinates career fairs for individuals with disabilities. They will also provide files of resumés for attendees. These files can be filtered to access the Schedule A candidates.

NAVFAC's Corporate Recruiting Resumé Tool also enables hiring managers to search for Schedule A candidates among all the applicants to NAVFAC. A manager can search for wounded warriors with this tool as well.

Other Potential Sources of Schedule A Candidates

The Workforce Recruitment Program for College Students with Disabilities (WRP) provides another source of candidates with disabilities for federal employment. The WRP program was created in the 1980s as an internal Department of the Navy effort and was expanded in the mid-1990s to serve the entire federal government under the sponsorship of the Department of Labor's Office of Disability Employment Policy (ODEP) and the Department of Defense (DoD).

The WRP helps connect federal agencies nationwide with college students and recent graduates with disabilities looking for summer, temp, and permanent jobs. The WRP provides a database of candidates representing a wide variety of career fields. The most recent database included 104 career fields.

Agencies can employ summer interns through the WRP and can use WRP as a source of candidates for both temporary and permanent positions. DoD has central funding that provides salaries for a defined number of WRP candidates for summer positions. Furthermore, the Computer/Electronic Accommodations Program (CAP) arranges for job accommodations without cost to the DoD agency for the summer hires. WRP can be a great pipeline for increasing the number of students with disabilities at your agency.

How WRP Works

So far in 2011, 87 trained recruiters from 20 federal agencies have visited over 200 college campuses. More than 2,200 candidates, including undergraduate, graduate, and law students, were interviewed and accepted into the database. Students in the database are categorized by job interest, degree program, geographic location, and other factors. The comments of the recruiters are included in each student's database profile. The database holds resumés and college transcripts that can be downloaded. The database is then opened to all agencies nationwide in early December and is active for 1 year. Some students are Schedule A eligible, and some are disabled veterans. Hiring managers can use the student internship programs (currently the Student Temporary Employment Program [STEP] and the Student Career Experience Program [SCEP]) to offer employment opportunities.

Since its inception, the WRP program has provided permanent jobs and internship opportunities to more than 6,500 students. DoD is by far WRP's biggest user.

Other Sources

Operation Warfighter is a federal unpaid internship program that assists recovering wounded, ill, and injured (WII) service members by providing internships for 15-20 hours per week on average. It enables the wounded warriors to rehabilitate and adjust into the workforce while also providing federal agencies with dedicated employees. This program is open to all WII service members assigned to a Service wounded warrior program. If interested in this program, contact Patrick Brick, the Operation Warfighter Program Manager, at patrick.brick.ctr@osd.mil, or Corey Hixson, the Operation Warfighter National Capital Region coordinator, at cory.hixson.ctr@osd.mil.

State Vocational Rehabilitation agencies (SVRAs) and state Disability Service agencies recruit potential applicants with disabilities. SVRAs provide counseling, evaluation, training, and other services to individuals with disabilities. SVRAs are one of several sources that candidates may use to obtain proof of disability and certification of job readiness required under the Schedule A appointing authority for people with disabilities. For more information, go to www2.ed.gov/about/offices/list/osers/rsa/. In addition, State Disability Service agencies, such as State mental health agencies, frequently have employment training programs and can be a good recruitment resource. Find your state's VR office at: http://askjan.org/cgi-win/TypeQuery.exe?902

Many untrained managers may fear that hiring an individual with a disability will be financially burdensome. Training can reduce that fear.

Training Managers

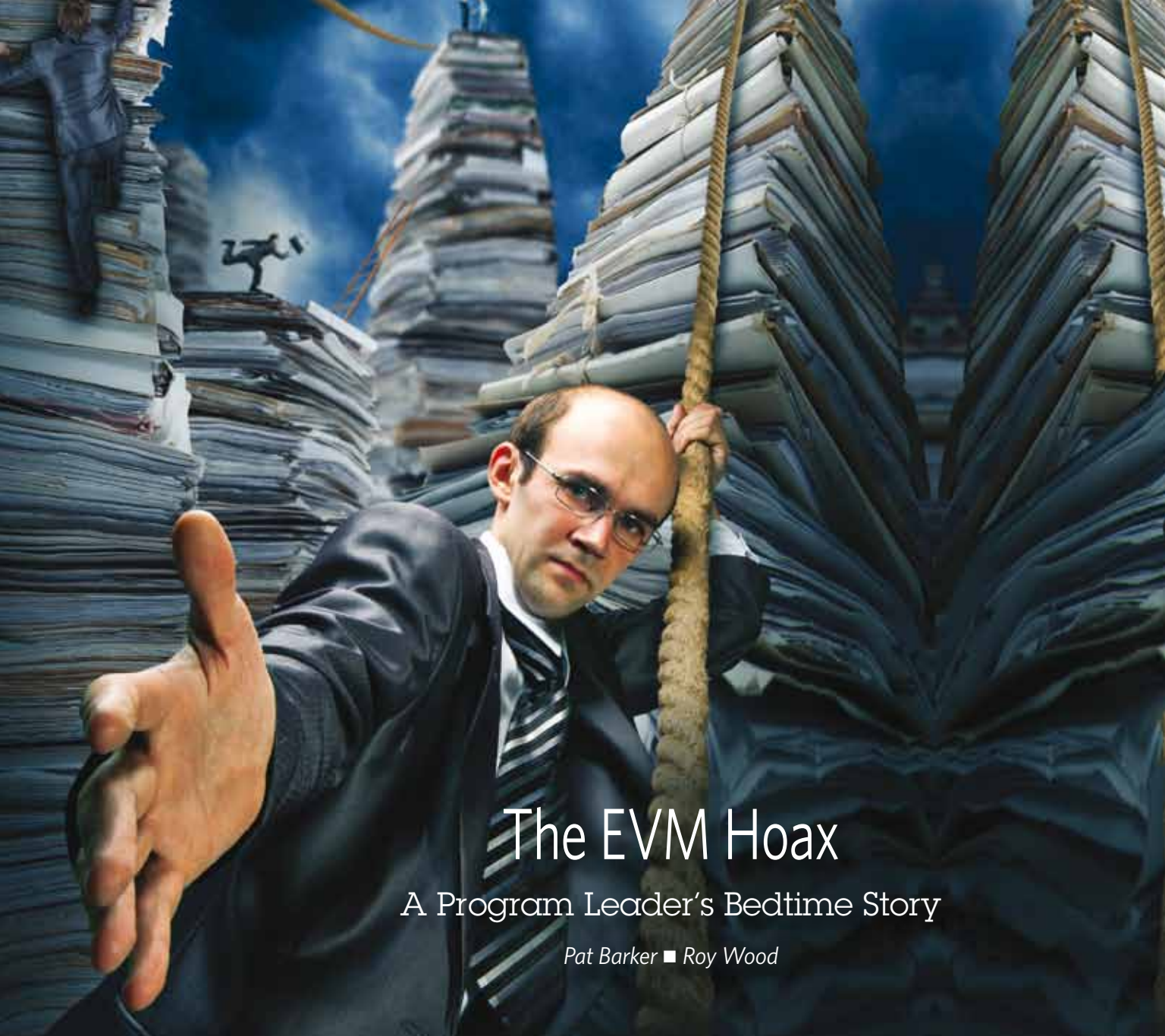
A recent survey found that only half the federal managers interviewed had the knowledge and tools to hire employees with disabilities. A recent article in *Government Executive* indicated that more than 1 in 3 (36 percent) managers said they were not familiar with Schedule A. Many untrained managers may fear that hiring an individual with a disability will be financially burdensome. Training can reduce that fear.

In a Government Accountability Office (GAO) report titled "Leading Practices That Could Increase the Employment of Individuals with Disabilities in the Federal Workforce," one of the top 10 leading practices identified for increasing the employment of individuals with disabilities in the federal workforce was "training staff at all levels regarding the implementation of policies and procedures related to improving employment of people with disabilities." The GAO report noted that this training may increase hiring managers' sensitivities to disability issues as well as improve and increase usage of Schedule A and other hiring authorities. Training is imperative!!

Conclusion

It takes an average of 102 days to complete all the steps in the competitive hiring process, from making the request, to making the appointment to bring the person on board. Schedule A is a great alternative to that process and greatly facilitates the hiring an individual with a disability. NAVFAC has taken advantage of the available networks within the Navy and federal government to increase the numbers of qualified and excellent wounded warriors and individuals with disabilities working at NAVFAC. Trained and equipped with Schedule A hiring authority and provided with the resources, NAVFAC and other agencies are well positioned to increase their numbers of wounded warriors and individuals with disabilities while gaining great employees.

The author can be contacted at **matthew.tropiano@navy.mil**.



The EVM Hoax

A Program Leader's Bedtime Story

Pat Barker ■ Roy Wood

About 20 years ago, a story surfaced about a substance called "dihydrogen monoxide." This compound was a major component of acid rain, deadly if inhaled, and often found in industrial solvents and nuclear power plants. Yet dihydrogen monoxide was also an excellent fire retardant and often found use as an additive to many food products in the supermarket! This story was a simple hoax that occasionally reappears on the web. For anyone with a basic chemistry background, "dihydrogen monoxide" is quickly recognized as H_2O. We call it water.

Wood *is dean of the Defense Systems Management College at DAU.* **Barker** *is an adjunct professor at American University who specializes in program management and leadership.*

When it comes to how we teach and train in the federal acquisition environment, the story of Earned Value Management (EVM) is not altogether different from the saga of dihydrogen monoxide. EVM is not a hoax, of course, but it often suffers unnecessarily, at one extreme, from the dismissive detractor who wishes to ignore its benefits and, at the other extreme, from those taken in by the tales of danger that EVM costs too much or is way too complex. One might wonder if those at the extremes of EVM are the same ones who did not do so well in high school chemistry!

In the minds of many federal acquisition professionals, EVM suffers from the unfortunate reputation as a system that requires excessive number-crunching and produces esoteric results that sometimes seem irrelevant to managing a program. Gold-card carrying EVM practitioners are often relegated to isolated corners of financial management shops where they can recite obscure passages from ANSI/EIA-748B while entering data into large, complex spreadsheets. Here, it is little wonder that EVM is far removed from the program manager's decision-making "inner circle." Even EVM training seems to reinforce the image that EVM is the territory of green-eye-shade accountants and Ouija-board mathematicians. It's little wonder that ordinary acquisition professionals approach EVM with pitchforks and torches. It is not uncommon to hear EVM descriptions, like:

- "EVM just won't work at our agency. We just don't have the expertise!"
- "Small businesses can't do EVM. It's too expensive."
- "EVM has too many acronyms and formulas to remember."
- "EVM software is confusing and too hard to use."
- "EVM is overkill for this contract because it costs too much and takes too long."
- "Our contractor does EVM; they send us CPI and SPI every month, so we don't need to do anything more."

Really?! We believe it is time for EVM to emerge from the dark recesses and be embraced for the powerful, interdisciplinary performance measurement tool that it is. EVM, simply put, is designed to be a leadership decision making tool. When used in this way, EVM has been quite successfully employed in acquisitions like the Navy's F/A-18 program, where strong leadership, an "interdisciplinary" common-sense approach, and discipline were the orders of the day.

Consider this: All successful programs, whether they realize it or not, employ some of the fundamental concepts and techniques of EVM. Pick up just about any project management book, and you cannot help but see concepts that might easily have been lifted straight out of an EVM manual. Here is a sample:

- Decomposition of complex systems into simple enough components to enable clarity and consistency in derivation of technical, schedule and cost objectives
- Linkage among these components and program functions and disciplines to create a single baseline with multiple but interdependent dimensions and views
- Proactive management of program performance, opportunity, and risk in relation to this baseline
- Empowerment and accountability for reasonable, repeatable, and defensible cost and schedule estimates at the lowest practical level of management

This hardly sounds like some esoteric bean-counting ritual.

Indeed, when embraced by program leadership and leveraged by all the functional disciplines, EVM allows you, your organization, and your stakeholders to have dependable and integrated visibility into the technical, cost, and schedule dynamics of projects.

As an example of how EVM might be used to drive program decisions, let's compare and contrast what might happen in a fictitious scenario of a program review with two very different leaders. The savvy PM embraces EVM and understands what

Reported "Metric"	Savvy PM Response	Uninterested PM Response
"We have a program CPI of 1.3."	"Hmm. You either front-loaded your baseline with meaningless work OR have substantial 'level of effort' earned value technique in there OR you need to publish a book called Best PM Practices Nobody Has Ever Discovered but Work Beyond All Imagination. Which is it?"	
"We have a program SPI of .98."	"Please don't just give me program information in SPI and CPI, and never, ever without showing me the actual integrated master schedule (IMS). I want you to tell me what is going on a level or two below the 'program level,' and we'll dive even deeper if there is a significant variance on my critical path tasks or in a big-ticket cost item."	
"We are 35 percent complete."	"Really? Does that mean 50 percent of your tasks are 70 percent complete; or 35 percent of your tasks are 100 percent complete? Let's talk about how many of the control account work packages are actually closed."	
"We completed our system requirements document last Tuesday."	"What does 'complete' mean here? 'Complete' because it weighs 3 pounds and you turned it in on time? Or 'complete' because all requirements are clear, unambiguous, verifiable, and traceable bi-directionally, complete in aggregate and accompanied with a verification matrix?'"	
"We have a schedule variance because we did not complete as much work as we planned."	"You are a master of the obvious. Please try that explanation one more time before you are 'unemployed because you no longer have a job.'"	
"Our EVM data show we are back on schedule with an SPI = 1.0."	"EVM doesn't give me schedule information. Only the integrated master schedule (IMS) gives me schedule information. Show me the IMS and what the critical path is looking like."	"Wow. That's in the green. Good job. Next slide, please. Better yet, is everyone okay if we just skip through the EVM slides and maybe get done an hour early today?"
"We no longer show a cost variance."	"That may be because you are burning down management reserve like there is no tomorrow. And that is poor planning. Let's talk."	
"We have recovered the work and now have no more schedule variance; we still have no cost variance."	"Cost variance always follows recovery of schedule variance. We'll see it soon enough. Plan accordingly."	
"Subsystem testing is complete."	"What does 'complete' mean? Did you meet all your test objectives? Is there re-work in our future?"	
"Our preliminary design review was completed last Thursday. Thanks for attending it."	"Your PDR can't be complete until all the exit criteria are satisfied. It is not a calendar-driven review. Show me how the EVM numbers reflect exit criteria completion. And if they can't reflect it, tell me: What exactly you are measuring these days?"	
"Our EAC is $1 million."	"We'll stop right here. Come back when you show me a best case and worst case along with it."	
"Our most likely EAC is $1 million. Worst case is $1.02 million. Best case is $996,000."	"Those numbers show such little variance; I don't know why we aren't making this firm-fixed price."	
"Our most likely EAC is $1 million. Worst case is $1.23 million. Best case is $975,000."	"Okay, you are trying. I see that. Very good. Now we can do some real decision-making and looking at trade space. Let's see how maybe we can aim to capture some opportunities. Show me how these numbers trace to the specific risks and the associated cost and schedule impacts. Let's start with your schedule risk analysis."	

she's being told; the other PM is, well let's say, less interested. How might the conversations go?

Earned value management, like dihydrogen monoxide—only seems bad to the uninformed. Indeed, the only danger of EVM comes when the program management team ignores it or relegates it to the dark recesses of the program office. The reality is that the disciplined insight and proactive decision-making enabled by EVM gives your program advance warning of problems in time to avert disaster. EVM data can empower leaders to know what kinds of questions to ask and recognize when the answers are insufficient.

In short, EVM is a powerful tool in the hands of a PM who knows how to use it. Dear reader, please do not panic at the sound of "EVM." Instead, learn to use it. The American warfighter and taxpayer deserve no less.

The authors can be reached at **learntolead@verizon.net** *and* **roy.wood@dau.mil.**

The Great Green Fleet

Naval Warfighting Imperatives for Energy Security

John F. Morton ■ Scott C. Truver, Ph.D.

U.S. Navy photo by Mass Communication Specialist 2nd Class Gregory N. Juday

What's Past Is Prologue

The U.S. Navy's Liquid Fuel Board in 1904 decided to transition the fleet from coal to oil, as engineers and operators alike had come to believe that oil-fired propulsion would greatly enhance the Navy's fighting trim. Three years later, the 'round-the-world voyage of the Great White Fleet underscored coal's logistical and operational challenges and the need for change.

Today, the Navy has embraced a far-reaching energy-efficiency strategy and is pursuing a broad spectrum of "technology insertions" that include alternative fuels for its ships and aircraft. This is already promising across-the-board enhancements for today's as well as tomorrow's fleet, not unlike the Navy at the turn of the previous century. And in that, the Service is focused on a game-changing target: the 2016 deployment of a "Great Green Fleet," first announced by Secretary of the Navy Ray Mabus in his October 2009 Navy Energy Forum address. The nation's energy vulnerability clearly has military and national security implications, he explained.

Truver *is director of national security programs at Gryphon Technologies LC, Greenbelt, Md.* **Morton** *is senior policy and programs analyst at Gryphon's National Security Programs.*

"We do not have operational independence, and we are tied to a vulnerable logistics tail," Mabus said. "[I]n the drive for energy reform the goal has got to be increased warfighting capability."

At the 2010 Navy Energy Forum, Chief of Naval Operations (CNO) Adm. Gary Roughead said the Navy's path to a Great Green Fleet was not a "public relations gimmick" but epitomized the Service's new energy-security research, development, policy and operations.

"It's more than simply how 'green' can we be seen," said Roughead. "It really is an operational issue for us."

The Green Fleet concept signals the Navy's strategic embrace of a dramatic sea change that could break dependence on fossil fuels for powering the future surface ships and provide an alternative energy model for the United States. In short, it's a strategic and operational imperative that cannot wait.

The Green Fleet concept signals the Navy's strategic embrace of a dramatic sea change that could break dependence on fossil fuels for powering the future surface ships and provide an alternative energy model for the United States.

Leveraging Partners

The U.S. Naval Sea Systems Command (NAVSEA) is working across multiple offices to address energy security and the planning and implementation across the fleet of what the Navy calls Energy Efficiency Enabling Technologies (E3T). Three NAVSEA partners have key roles in the E3T Green Fleet enabling effort: NAVSEA's Naval Systems Engineering Directorate (SEA 05), the Surface Warfare Directorate (SEA 21), and the Program Executive Office (PEO) Ships in the Office of the Assistant Secretary of the Navy for Research, Development and Acquisition.

SEA 05 and SEA 21 have NAVSEA "roles and missions" responsibilities for energy efficiencies and reducing the "carbon footprint" of the Navy. SEA 05 has E3T technical authority and is responsible for the design, engineering and validation of the costs and safety of Green Fleet technologies and systems for both new-construction and in-service assets. SEA 21 has the responsibility for inserting these technologies into existing non-nuclear surface warships, vessels and craft, which promises near-term benefits: 80 percent of the ships that will be in the surface fleet of 2025 are now in service. As its NAVSEA partners prove Green Fleet technologies/systems in the in-service fleet, PEO Ships is responsible for inserting them into new-construction programs, like the littoral combat ship.

NAVSEA is also collaborating with enterprise partners throughout the Navy, DoD, and other federal agencies, as well as with industry and academic communities to enhance the surface fleet's energy efficiency and reduce its environmental footprint. On various energy-efficiency initiatives, NAVSEA has reached out to the fleet, Military Sealift Command, Oceanographer of the Navy, Office of Naval Research, Coast Guard, Maersk Line Limited, Department of Energy, Royal Australian Navy, Royal Navy and Royal Danish Navy.

NAVSEA's energy efficiency efforts afloat are also directly linked to the Task Force Energy Program in the CNO's Energy and Environmental Readiness Division (OPNAV N45), whose director, Rear Adm. Philip Cullom, is dual-hatted as director of Task Force Energy. The CNO stood up the program in October 2008, and a year later, Cullom helped to shape Mabus' strategic energy vision: "Energy reform," Mabus said, "is a strategic imperative."

Task Force Energy comprises Navy headquarters resource sponsors, systems commands, and the fleet to make better use of Navy energy resources. Together, they are advocating new technologies or enhancements to existing technologies that can increase future combat capability and operational responsiveness through energy efficiency. These new technologies reduce mission risks that might result from the lack of available energy or volatile costs that consume Navy operating budgets.

"There are many things NAVSEA and the fleet can accomplish simply by changing the way they operate and changing the culture to emphasize that energy efficiency and alternative energy are critical for today's Navy and the Navy of tomorrow," Rear Adm. James P. McManamon, NAVSEA deputy commander for surface warfare, said in an April 2011 interview.

Reining in Total Ownership Costs

For several years, Team Ships—the lashup of SEA 21 and PEO Ships—has been implementing numerous total ownership cost initiatives effectively at the individual program level. The team is now elevating that approach to reduce the cost of ownership across the entire Surface enterprise. In August 2010, for example, Team Ships leaders—SEA 21's McManamon and former PEO Ships Rear Adm. William E. Landay, III—issued a

"Sailing Direction on Energy Security" that addressed the "direct impact on warfighting effectiveness" of the cost of energy.

To ensure that "direct impact," Team Ships is putting in place an integrated approach to improve energy efficiency and expand the adoption of renewable energy sources. The goal is to address increasing shipboard power demands, historically high operational tempos and the need to reduce costs. Technology development and system integration challenges will increase with the need to reduce fuel consumption, balance mission requirements, and increase available electrical power.

Team Ships is leveraging the ongoing efforts of the Navy's Task Force Energy and Maritime Working Group. Task Force Energy has been developing an energy strategy that includes op-testing of its resilience to possible future energy scenarios. The task force is the place where the innovation pipeline starts as it optimizes design and does the engineering. The task force also oversees the Maritime Energy Roadmap that charts the Navy's collaboration with other services, government agencies, industry, and academia to facilitate energy efficiency initiatives within the acquisition process and lower ownership costs. The Maritime Working Group is developing the Maritime Energy Roadmap to identify the most promising technologies for the Green Fleet for each of its 2012, 2016 and 2020 timeframes. Task Force Energy is looking for technologies having TOCs that are low-cost with near-term breakeven points.

To answer those rudder orders, SEA 21 and SEA 05 have grouped their energy-efficiency technologies into three packages that align with the three-phased rollout of the Great Green Fleet. The first target date is 2012, when the Navy plans to begin demonstrating the Green Fleet in operations near homeports. The first package consists of 11 insertion technologies—several of which in the summer of 2011 are ready for installation—to provide immediate energy efficiencies on the Fleet's conventionally powered surface ships and craft. The first technology package includes: hybrid electric drive, solid state lighting, foul release coatings, online gas turbine water wash and generator efficiency improvements, combustion trim loop, Smart Voyage Planning decision aid, stern flaps, variable-speed motor drives and alternate fuels.

Not breathtaking on an individual basis, but in the aggregate these can have significant impacts on business as usual. The technologies in NAVSEA's 2012 Green Fleet package have a 24-36-month return on investment that is well within the future year's defense plan.

Inserting Technology

Among the numerous initiatives and programs that will contribute directly to the fleet energy efficiencies, several are available now.

Hybrid-Electric Drive (HED) Propulsion. The Navy has two HED system designs: *Makin Island's* Auxiliary Propulsion System, already deployed, and the DDG 51 Flight II Class's Electric Propulsion System, currently in proof-of-concept phase and planned for installation on USS *Truxtun* DDG 103 in 2012. During *Makin Island's* two-month maiden voyage, the ship saved more than $2 million against comparable costs of the steam plant aboard the earlier ships in the class up to USS *Iwo Jima* (LHD 7). The ship logged 33 percent of her transit time on gas turbine propulsion and 67 percent of her transit time on auxiliary electric propulsion. Initial data suggest that the potential (fuel and non-fuel) savings could be as much as $6 million annually or $240 million throughout a 40-year service life. The auxiliary plant technology is also being installed in the USS *America* (LHA 6), the lead ship in what will be the Navy's first—from the keel up—"green" class of ships.

The HED propulsion plant modification allows the ship to operate in two modes: using the ship's gas turbines or the electric motor. The system that is planned for backfit in the DDG 51s offers the potential for fuel savings of 8,000 barrels or $1 million per ship, per year.

Figure 1. Green Fleet Technology Insertion Packages

Energy Efficiency Enabling Technologies		
2012	**2016**	**Future**
Hybrid Electric	Hull Hydrodynamic Mods	New Engines and Generators
Alternate Fuels	Generator Mods	Fuel Cells
Solid State Lighting	Heat Energy Recovery	Wind Energy Harvesting
Foul Release Coatings	High Efficiency Chillers	Solar Energy Harvesting
Online GT Water Wash	Energy Dashboard	Air Film Hull Drag Reduction
GTG Efficiency Improvements	Propulsion Mods	
Combustion Trim Loop	Degaussing Mods	
Smart Voyage Planning Decision Aid	Advanced RO Desalinator	
Stern Flaps	Electric Meters	
Variable Speed Motor Drives	Energy Storage Modules	
Low Solar Absorption Coatings		

Another complementary technology to HED is the ship-wide Energy Storage Module. Today, many ships operate with two gas turbine generators online to prevent a "dark-ship" condition in case of mechanical failure, even though the load could be handled by a single generator. The Energy Storage Module will allow ships to operate a single generator, potentially saving another 8,000 barrels per ship per year.

Solid State Lighting (SSL). Solid State Lighting illumination technology uses light-emitting diodes (LEDs) as sources of light rather than electrical filaments, plasma or gas. LEDs emit visible light when a direct current is passed through them. Luminaries are designed to use numerous small, point-source lights. The potential fuel savings are not dramatic, on the order of 500 barrels per year for a guided missile destroyer. But, assuming $96 per barrel and 65 or so DDGs in the active forces, the Navy could avoid more than $3 million in annual fuel costs. SSL technologies in mid-2011 were onboard the USS *Wasp* (LHD 1), USS *Iwo Jima* (LHD 7), USS *Pearl Harbor* (LSD 52), USS *Chafee* (DDG 90) and USS *Wayne E. Meyer* (DDG 108).

The Green Fleet initiatives will reduce the U.S. Navy's surface ship carbon footprint, enhance efficiencies and lower total ownership costs.

Anti-Fouling Coatings. The Fleet Readiness R&D Program is sponsoring ship demonstrations for two different anti-fouling coating applications. The Aegis guided missile destroyer USS *Cole* (DDG 67) and Aegis cruiser USS *Port Royal* (CG 73) are demonstrating hull coatings, and the USS *Gunston Hall* (LSD 44) is demonstrating propeller coatings. Fouling-release underwater hull coatings mitigate biofouling without relying on biocides. Operators of commercial ships with high operational tempo claim the use of these types of coatings can result in an annual fuel savings of more than 10 percent. Potential fuel savings for a DDG is on the order of 1,800 barrels per year.

Gas Turbine Online Water Wash. Water-wash technology applies to gas turbine generators when they are periodically shutdown and washed to improve compressor performance and extend operating life. The online water wash system allows performance of the compressor wash while the engine is in operation. For affordability, it uses and augments the existing offline wash equipment architecture. In mid-2011 installed in the USS *Preble* (DDG 88), the online water wash will reduce fuel consumption, reduce maintenance costs and improve starter life by extending the time between offline washes. In the interim periods, it will keep the compressor section of the gas turbine cleaner and more energy efficient.

Combustion Trim Loop. The Navy has begun installing combustion trim loop systems onto USS *Wasp*-class (LHD 1) amphibious ships to improve fuel efficiency and save up to 2,400 barrels of fuel per ship annually. This system optimizes the fuel-air mixture for the ship class's two boilers, making them more efficient. The USS *Bonhomme Richard* (LHD 6) and USS *Blue Ridge* (LCC 19) are currently having the system installed, following system validation on board USS *Peleliu* (LHA 5), which completed in July 2010. LHDs 1 through 7 will receive the new system by the end of 2016.

Stern Flaps. The first SEA 05 Fleet Readiness Research and Development Program (FRR&DP) project to complete the process has been the installation of stern flaps on two amphibious class ships. Stern flap technology improves a ship's hydrodynamic characteristics by reducing drag. In April 2009, the USS *Whidbey Island* (LSD 41) was the first amphibious ship to receive the flaps. Based on the data from previous stern flap insertions, the expected fuel efficiencies could yield savings as much as $450,000 in fuel costs per ship annually, based on a fuel price of $96 per barrel. The USS *Kearsarge* (LHD 3) was the second amphibious ship to install a stern flap. Once stern flaps are fleet-wide on all LSDs and LHDs, the Navy expects the project to yield an annual savings of some $6.3 million. Additional installations will go on *Arleigh Burke*-class (DDG 51) Aegis destroyers, *Ticonderoga*-class (CG 47) Aegis cruisers, *San Antonio*-class (LPD 1) amphibious transport dock ships and *Cyclone*-class (PC 1) coastal patrol craft.

Smart Voyage Planning (SVP) Decision Aid. SVP is a tool that allows the Navy to make smarter decisions during in-transit operations. The software application uses hull-form data combined with real-time weather and current information to compute the best route and optimize ship routing on fuel savings. Shipboard applications would extend and interface with the Electronic Chart Display and Information System—Navy (ECDIS-N). The SVP tool would also be used ashore for Fleet Forces ship scheduling. By using real-time data and computing power to plot routes, SVP has the potential to save 4 percent in annual fleet-wide fuel costs. The SVP Decision Aid is on board the USNS *Carl Brashear* (T-AKE 7) dry cargo/ammunition ship and is used at the Naval Maritime Forecast Centers in Norfolk, Va., and Pearl Harbor, Hawaii.

The Biofuels Promise. The operational side of the Great Green Fleet initiative begins in 2012 when the Navy will demonstrate a green strike group of two destroyers and a cruiser running on biofuels in local operations. In 2016, the second phase, it will fully deploy the Great Green Fleet aircraft carrier strike

group keyed to a major exercise. All surface warships will run on hybrid-electric drive and alternative power systems using biofuel. By 2020, Green Fleet phase three, Mabus wants half of the surface Navy's fuel consumption to be alternative fuels. The candidate alternative fuel must meet fuel requirements, will require no change to the ship and can be mixed or alternated with petroleum fuel.

In 2010, the Naval Surface Warfare Center's Carderock Combatant Craft Division completed an at-sea HRD-76 biofuel demonstration on a 7-meter rigid hull inflatable boat at Fort Monroe, Va. CCD then tested a 50/50 blend of NATO F-76 diesel fuel and an algae-based biofuel on the next-generation 49-foot riverine command boat experimental (RCB-X). The RCB-X clocked 44.5 knots and performed sudden stops, reversals, circles, and tight U-turns. NAVSEA conducted the first full-scale diesel component and engine test on a Cummins QSB marine diesel engine, which ran for 256 hours without a hitch. The road map for shipboard demonstrations includes milestones leading to a biofuels introduction into the fleet in 2012.

The Great Green Fleet is not about making the "business case" for biofuels. It has a much broader impact. The Green Fleet initiatives will reduce the U.S. Navy's surface ship carbon footprint, enhance efficiencies and lower total ownership costs. "There's very little funding to jump-start new programs," McManamon explained, "so we are starting with proven technologies and systems and looking for the low-hanging fruit that cumulatively will have significant impacts on the overall Navy—not simply an individual ship or class."

Making Way for the Great Green Fleet

A century ago, President Theodore Roosevelt remarked how "Bully!" it was to witness 16 white-painted battleships of the U.S. Atlantic Fleet and their escorts pass Hampton Roads, Va., in review. "Did you ever see such a fleet and such a day?" he exclaimed that December 1907 morning.

But there was a serious purpose for the Great White Fleet, in addition to broad patriotism. "I want all failures, blunders and shortcomings to be made apparent in time of peace and not in time of war," the president said before the Fleet deployed on its year-long, around-the-world cruise. Only this way could he be assured of a "Navy second to none."

Today, the Great Green Fleet represents an ongoing demonstration and deployment of small, incremental energy efficiency efforts and initiatives that have potentially large—if not game-changing—impacts throughout the Navy. Much like the transition from sail, to coal, to oil....

When it comes to the promise of the Great Green Fleet, McManamon noted, "We're hitting a lot of 'singles' but not many home runs, yet. Those will come."

The authors can be contacted at **jfmorton@prodigy.net** *and* **sctruver@aol.com.**

Where Can You Get the Latest on the Better Buying Power Initiatives?

- BBP Gateway (**https://dap.dau.mil/bbp**) is your source for the latest information, guidance, and directives on better buying power in defense acquisition
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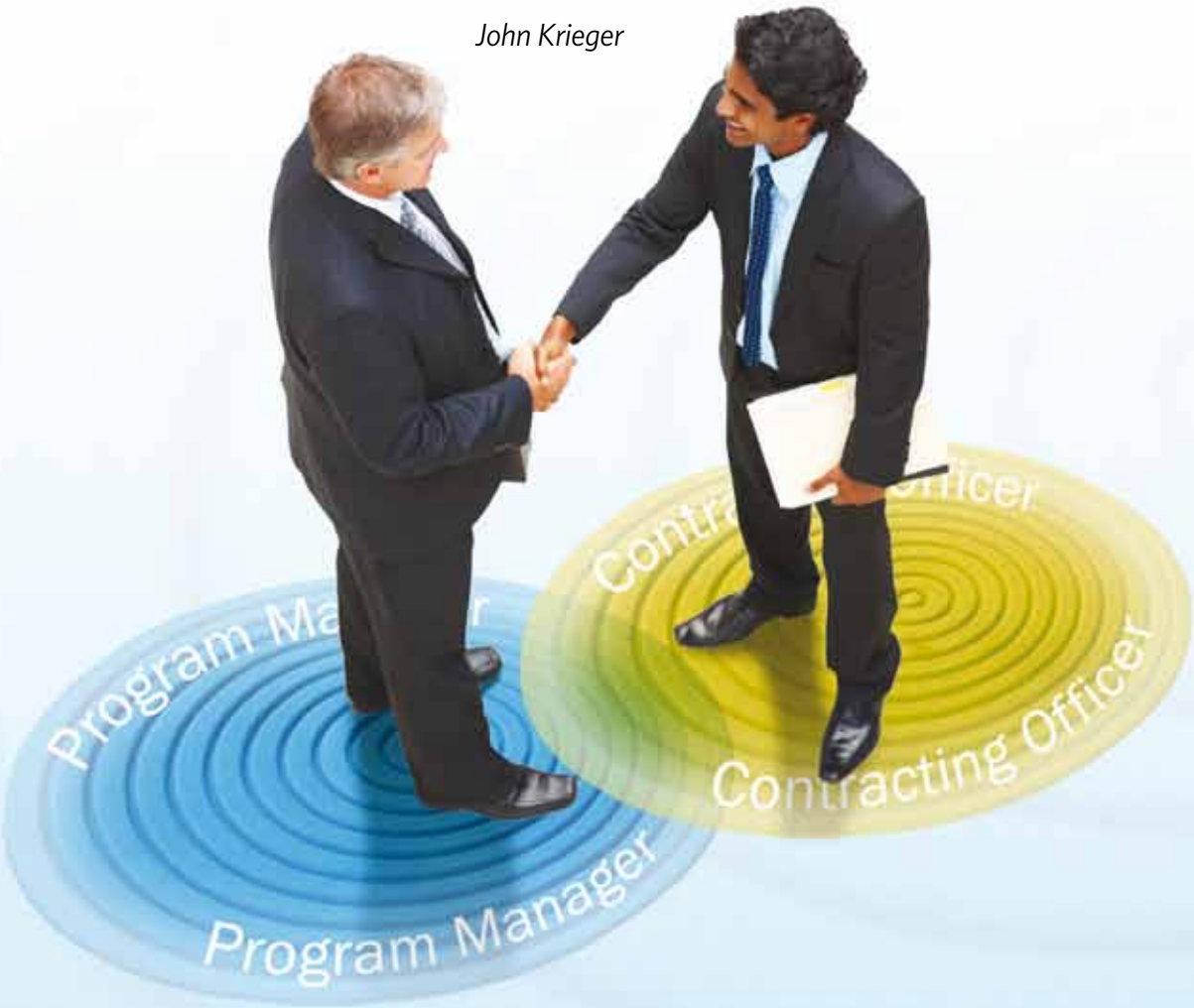
Knowing and Loving Your KO

A Guide for Program Managers

John Krieger



In the OSD Study of Program Manager Training and Experience, program managers gave high marks to their acquisition training concerning "Contracting Challenges." But, personal one-on-one interviews with Program Executive Officers and Program Managers caveated that by indicating that they were concerned about how to communicate, and get along with, their contracting officers (KOs). No surprise there. How do we go about achieving that?

The Study

Over the last several years, the Office of the Under Secretary of Defense (Acquisition, Technology and Logistics), in conjunction with DAU, as part of its human capital initiatives, has been conducting competency assessments of various acquisition functional communities (e.g., Acquisition and Program Management, Contracting, Life Cycle

Krieger *is an independent acquisition consultant supporting DAU's Defense Systems Management College. He had 31 years of government experience in contracting and acquisition before retiring from the Civil Service and is a former assistant commander for contracts at the Marine Corps Systems Command.*

Table 1. Percent of interviewees answering "yes" to whether acquisition training was sufficiently practical and comprehensive.

	"Yes"
Responding to Military Service Inquiries	**63%**
Contracting Challenges	**59%**
Understanding and Using Government Financial Reports	**55%**
Responding to OSD Inquiries	**55%**
Systems Engineering Challenges	**53%**
Responding to Inquiries From Outside DoD	**53%**
Changes in Technical Requirements	**51%**
Test and Evaluation Challenges	**51%**
Risk Management Challenges	49%
Source Selection Challenges	45%
Logistics Challenges	45%
Changes in Directed Funding	43%
Technical Failures	43%
Changes in Directed Schedules	41%
Dealing with User Requirements	41%
Understanding and Using Contractor Financial Reports	39%
Earned Value Challenges	37%
Overseeing Contractor Performance	31%
Cost Estimating Challenges	27%
Software Management Challenges	25%
Cost Control Challenges	25%
Unexpected Cost Growth	14%

Logistics). Dave Ahern, Director, Portfolio Systems Acquisition, OASD(A), the functional advisor for acquisition and program management, oversaw the conduct of an initial Program Management Competency Assessment, with a goal of reaching 1,300 employees. The survey instrument was sent to 4,271 randomly identified professionals, of whom 1,568 completed the assessment, for a total response rate of 36.7 percent. The results of the survey provided information for OSD to "Adjust human capital strategies and organizational level decision making in such areas as:

- Education, training and development modification based on learner characteristics
- Targeted recruitment and retention to shore up strengths or heal weaknesses in workforce or at the command level
- Conduct strategic human capital planning
- Workforce/manpower allocations and other resource allocations."

However, Ahern wanted even more insight into the competency level of the functional community, so he directed the OSD Program Management Certification Study, which was developed, conducted and prepared by DAU, with representatives of academia and industry. The study was much more targeted than the initial assessment. It consisted of two parts. One part was a set of more specific questions, provided to a targeted group of program executive officers (PEOs) and program managers (PMs). The other part consisted of in-depth interviews with PEOs and PMs. Table 1 shows the distribution of "yes" answers to the question, "Is acquisition training sufficiently practical and comprehensive (other than on-the-job training) to enable you to manage or deal effectively with this challenge?" Note that the "yes" answers to "Contracting Challenges" constitute the second highest of all the 22 generic challenges.

That said, one might think that program executive officers and program managers who took the survey are sanguine about their knowledge of contracting. Not so, as indicated by a number of comments that came out of the in-depth interviews:

- "DoD PMs often have significantly less knowledge and experience in contracting than their contractor counterparts. PMs need to be trained to read and understand the contracts relating to their acquisition program. They need training in the process of contracting as well as in the mechanics of contracting."
- "PMs need to have sufficient depth in contracting to be able to have an intelligent discussion with their contracting officers and to know where a contracting officer does and does not have flexibility on a contract."
- "PMs should be trained to a higher level of competence in contract incentives, including (a) award fees and (b) how government contributions to contractor overhead costs on a contract can reverse the intended effects. (Low fees undermine contract incentives.)"
- "My PM contracting training was only in the fundamentals; little training in incentives or in contracting strategies. PMs need more training to deal with contracting strategies and the intricacies of negotiations."
- "PMs need to be trained in ways to provide contractors candid feedback on CPAF contracts."

Based on the integrated analysis of the surveys and the interviews, the Study produced the following findings:

- Program managers need additional training in industry practices, including factors that motivate contractors and ways in which PMs can use incentives to achieve better program performance for the government customer.
- Additional earned value training with applications, combined with experience in financial management, is necessary to enable program managers to use predictive indicators to anticipate program challenges, assess more accurately the condition of their programs, and deal more effectively with financial problems.
- Additional training and experience in contracting is necessary for program managers to deal more effectively with contracting officers and contractors.

Although nobody ever wants to address the question, a program manager is the contracting officer's COR, sans portfolio. I suspect that the relationships between KOs and PMs are governed by how they view this relationship.

So how do we go about providing that additional training on dealing more effectively with contracting officers? Well, for my part, Ahern personally told me that I had to work on making that happen. I've gone about doing that in two ways. The first was to introduce the topic into the contracting portions of the program management courses that my teaching partner and I support in DAU's School of Program Management. The second is this article.

The Relationship

What's a KO? He or she is the contracting officer. And, according to the Federal Acquisition Regulation (FAR) FAR 2.101:

"Contracting officer" means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the contracting officer acting within the limits of their authority as delegated by the contracting officer.

Interestingly enough, the only thing that keeps a program manager from being a contracting officer's representative (COR) and, therefore, technically, a "contracting officer," is the requirement that they be designated and authorized in writing. Although nobody ever wants to address the question, a program manager is the contracting officer's COR, sans portfolio. I suspect that the relationships between KOs and PMs are governed by how they view this relationship. I would posit that the worst contracting officers believe this to be true, and the best program managers believe this to be true.

It all gets to the issue of who is in charge. Whom does the contract belong to? Some contracting officers will say that it belongs to them. Some program mangagers will say it belongs to them. Although some of you might believe this is like trying to decide whether the glass is half full or half empty, it is not. If you look at Block 27 of a Standard Form 33, Solicitation, Offer and Award, you'll find the truth of the matter is that it belongs to the United States of America, although it has been signed by a contracting officer. (By the way, the glass is neither half empty nor half full; it's the wrong size.)

Part of the reason that contracting officers might believe that they are the top dog is that the term "contracting officer" appears 5,381 times in the FAR, while the term "program manager" appears a mere 7 times. If it would help program managers feel better, the term "systems engineer" appears 0 times in the FAR. But, it's not about the contracting officer, program manager, systems engineer, or any other functional personnel, it's about the acquisition team: "The Acquisition Team consists of all participants in Government acquisition including not only representatives of the technical, supply, and procurement communities but also the customers they serve, and the contractors who provide the products and services."

Very closely related to the question of ownership of the contract is ownership of the single most important document that sets up the contract, the acquisition strategy. And, although ownership of the contract might appear ambiguous in the FAR, ownership of the strategy is not:

> The program manager, as specified in agency procedures, shall develop an acquisition strategy tailored to the particular major system acquisition program. This strategy is the program manager's overall plan for satisfying the mission need in the most effective, economical, and timely manner. The strategy shall be in writing and prepared in accordance with the requirements of Subpart 7.1, except where inconsistent with this part, and shall qualify as the acquisition plan for the major system acquisition, as required by that subpart.

So, before there is a contract, the program manager (PM) owns the Acquisition Strategy that the contracting officer will seek to implement. In the Department of Defense, the PM also owns the acquisition plan, if written as a separate document. Defense Federal Acquisition Regulation Supplement (DFARS) 207.103(g) states, "The program manager, or other official responsible for the program, has overall responsibility for acquisition planning." On the acquisition team, the PM is responsible for what needs to be done to execute the program through the various phases, as articulated in the acquisition strategy. The KO, in concert with the PM and other members of the acquisition team, implements that strategy through the contract with industry, recognizing, of course, that the acquisition strategy also includes efforts with other parts of the Defense enterprise (e.g., test community, field agencies).

One of the comments we often hear from PMs is, "My contracting officer is always saying no." There may be a reason for that, because although the FAR is a very permissive document, "no" appears 1,150 times. Even if you exclude the 149

Table 2. Instances of Negative Phrases in the Federal Acquisition Regulation

No	1150
No.	149
Prohibit	17
Prohibits	13
Prohibited	74
Shall Not	730
May Not	133
None	55
Yes	612

instances where that is the abbreviation for number, that leaves a lot of noes. And, that isn't even counting prohibit, prohibits, prohibited, shall not, may not, none. But, the counts for those appear in the table below. Unfortunately, of the 612 times the word "yes" appears, 610 are in check blocks for contractor responses in provisions or clauses or in the clause matrix, used for selecting provisions and clauses. There are only two other yeses, both references to the "yes" radio button on the Governmentwide Point of Entry (GPE) (https://www.fedbizopps.gov).

Table 3. FAR and DFARS/PGI Changes

- 51 Federal Acquisition Circulars (FACs) issued since March 2005 [Through FAC 2005-51]
  + 4 Amendments
  + 1 Technical Amendment
  + 1 Revision
  + 1 Addendum [20 pages]
  + 1 Thresholds Matrix [34 pages]
  + 8 Corrections
- 90 Defense FAR Supplement Publication Notices[1] issued since January 2008 [Through DPN 20110511]
- 64 Open FAR Cases
- 72 Open DFARS Cases

[1] Previously Designated Defense FAR Supplement Change Notices.

These changes do not even take into account the myriad of USD(AT&L) and DPAP policy memoranda.

11 May 2011

Does that mean the FAR should be used to say no? Just the opposite. The statement of guiding principles for the Federal Acquisition System, which was added on July 3, 1995, the program manager's Independence Day, included the following statement at FAR 1.102-4(e):

> The FAR outlines procurement policies and procedures that are used by members of the Acquisition Team. If a policy or procedure, or a particular strategy or practice, is in the best interest of the Government and is not specifically addressed in the FAR, nor prohibited by law (statute or case law), Executive order or other regulation, Government members of the Team should not assume it is prohibited. Rather, absence of direction should be interpreted as permitting the Team to innovate and use sound business judgment that is otherwise consistent with law and within the limits of their authority. Contracting officers should take the lead in encouraging business process innovations and ensuring that business decisions are sound.

That language is the license to say YES! So how do the program manager and the contracting officer get to yes? Look for the answer in Part 2—appearing in the January-February 2012 issue of *Defense AT&L*.

The author can be contacted at **john.krieger@dau.mil.**

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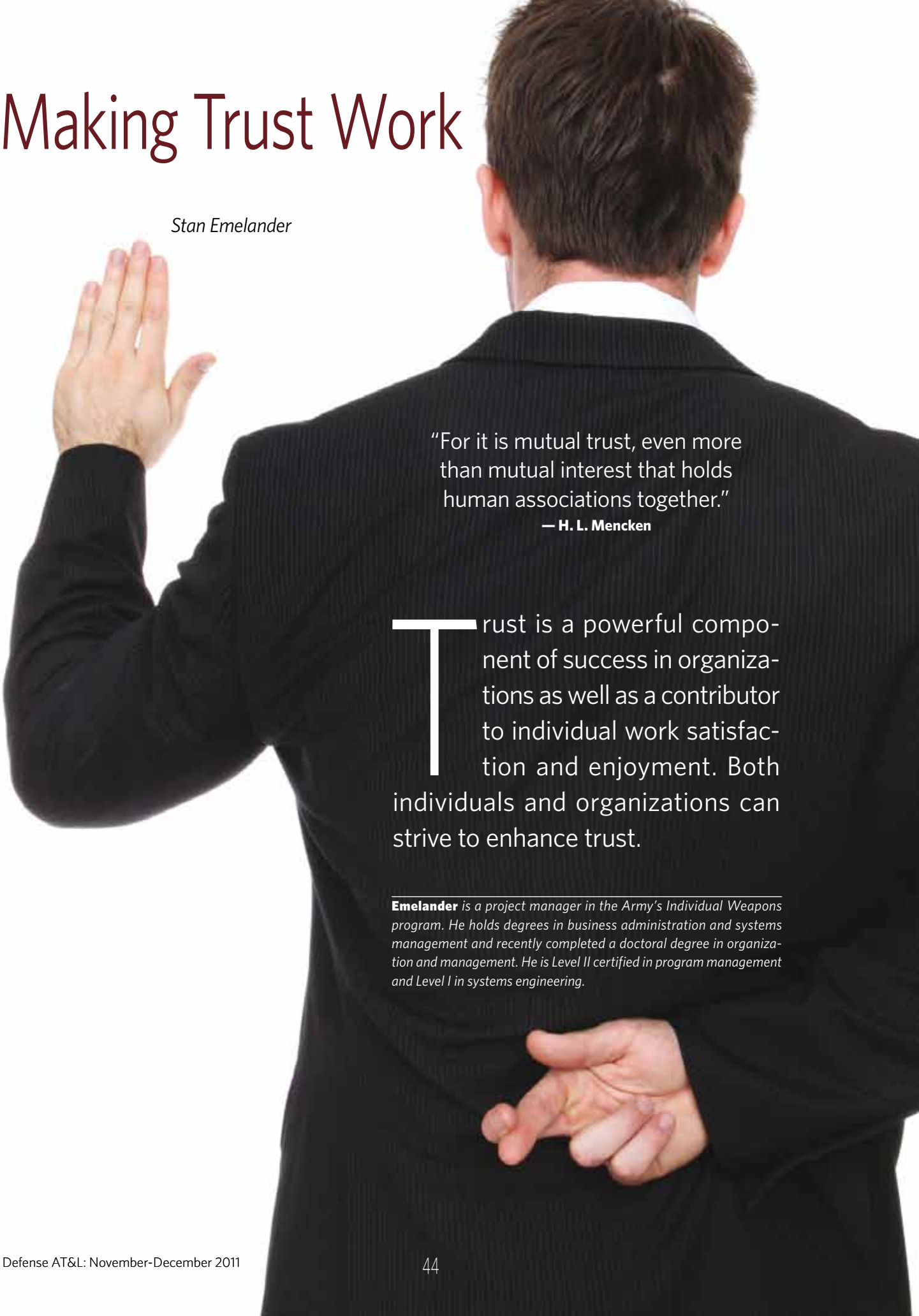
Making Trust Work

Stan Emelander



"For it is mutual trust, even more than mutual interest that holds human associations together."
— H. L. Mencken

Trust is a powerful component of success in organizations as well as a contributor to individual work satisfaction and enjoyment. Both individuals and organizations can strive to enhance trust.

Emelander *is a project manager in the Army's Individual Weapons program. He holds degrees in business administration and systems management and recently completed a doctoral degree in organization and management. He is Level II certified in program management and Level I in systems engineering.*

Imagine working in an organization where workers and supervisors have strong bonds of trust. Next consider an atmosphere of nonchalance or even distrust. The visceral difference between the two scenes underscores the importance of trust as factor in the workplace. Trust is both the glue that binds successful organizations together and the lubricant that frees workers to be creative and productive. This article describes the benefits of trust, discusses barriers to its formation, and identifies behaviors that build a trusting climate and relationships with special focus on program and project teams and their leaders.

Trust Defined

Trust is a belief that others, including both people and organizations, will behave in a way that does no harm when they are unobserved. Trust varies by degree in two dimensions: interest alignment and competence. Interest alignment can vary from aligned—implying intentional benefit from the object, to neutral—an assumption that the object at least has no harmful intentions, to hostility. Assessments of competence can range from effective to ineffective. Thus, even closely aligned agents will lose trust if their behavior is inconsistent or ineffective.

Importance of Trust

Trust benefits individuals, teams, and whole organizations because it builds a positive social climate, enhancing motivation and productivity. Employees build motivation by identifying with and valuing both their work and the people they work with. Identification with work grows when employees are trusted to make autonomous decisions about their approach to job tasks. When workers identify with their work they also come to value it more highly. Identification and valuing are components of job engagement, which is in turn linked to productivity. Engaged, productive workers are perhaps the most vital component for organizational success and they are also more likely to practice organizational citizenship behaviors (OCB), actions outside the bounds of their job description that benefit the organization.

The need for exhaustive monitoring and control is lowered when we trust the values and performance of business partners. Contracting is a recognized area where trust matters to project managers. When parties to a contract trust each other fewer detailed clauses and specifications need to be spelled out in print or be inspected on-site because standards of performance can be relied upon. When a contractor delivers faulty goods or services, trust in their performance is eroded resulting in the need for increased oversight, a burden to all parties.

Trust is an important factor in teams, especially those that are permanent or semi-permanent. Because of the time spans involved in DoD acquisitions, both project teams and work groups within organizations fit this criterion. Individuals, and the teams they comprise, possess finite amounts of energy to expend on job demands. Trust makes teamwork more efficient by reducing the energy spent speculating about others' motives and capabilities. When team members trust each other, suggestions are less likely to be viewed with suspicion and competition can be replaced with cooperation.

Team creativity and innovation are two other areas related to trust. Innovation always entails a degree of risk, including the threat that the innovator will be attacked or criticized. When team members trust each other their inhibitions are lowered, leading to a freer exchange of ideas. Such exchanges lead to better solutions than any individual could have arrived at alone, a synergy that is one of the major advantages of teamwork.

A leader's trustworthiness is also related to the types of power they can employ. According to the classic French and Raven model, power is built upon five aspects labeled Coercive, Reward, Legitimate, Referent, and Expert. The power a leader may access varies in different circumstances, and it is advantageous to build power in each aspect to enhance effectiveness and flexibility. While coercive power is linked to negative management styles, conditions that erode trust, and legitimate power is trust-neutral, trust enhances the effectiveness of the other three aspects. We tend to trust those who have expert knowledge, are consistent in delivering rewards, and with whom we identify personally (the referent aspect). Leaders and managers at every level, including project managers, can build their power base by being trustworthy.

Barriers to Trust

The differences between people are one of the major sources of mistrust. Overt differences between groups, including race, age, gender and ethnicity, are well-researched barriers to trust formation. We tend to trust in-group individuals more than those from out-groups. While the debate about whether mistrust of this kind is instinctive or learned continues, there is no argument about it being commonplace. More subtle differences, including belonging to different divisions within an organization, also affect trust. Matrix teaming arrangements are pervasive in project management work, and project managers must work with team members representing numerous organizations, such as contracting, test and evaluation, logistics, and budget offices. Opinions about the trustworthiness of the organizations they represent can raise or lower the initial levels of trust such team members are afforded.

Inconsistent behavior towards others impacts trust formation. We build opinions about the character and trustworthiness of people by observing how they behave towards others. When

colleagues act in a Machiavellian, manipulative way towards others in an out-group, team members assume that those same standards could apply to in-group behavior if the conditions are right.

We also carry the seeds of mistrust through our inability to communicate perfectly. Communications are vulnerable to error from both the sender and receiver. Consider the supervisor who states "I do not want be harsh about this." While the supervisor may intend to express empathy, followers may interpret the statement to mean the supervisor considers harsh behavior a realistic option, eroding trust. On the receiving end, people may make use of cognitive shortcuts, called heuristics, to interpret communications without really understanding the content. Heuristics lead us to think that because current events appear similar to the past we know what will happen next, sometimes leading to jaded "been there, done that" attitudes. This thinking can be a barrier to leaders trying to establish credentials as trustworthy change agents in the firm.

All of these factors and more can combine in project teams. Larger projects are often multi-national in scope, including team members with different cultural and ethnic backgrounds. Matrix management arrangements are the norm in project teams, potentially raising questions about the focus of many team members. Trust is facilitated by personal contact, but many project teams meet virtually most of the time, reducing the richness of communications and hindering formation of trusting ties.

Building Trust

Efforts to earn trust should flow both ways between leaders and followers. Individual workers must be aware of how coworkers and supervisors form positive opinions of trustworthiness: observation of behavior that is consistent and supportive. An awareness of common barriers to trust, such as out-group prejudice and heuristics, is a first step in working to become more trusting oneself. Avoiding emotional confrontation and behavior that could be interpreted as backstabbing establishes a foundation of trustworthiness. It is also important for employees to communicate frequently and honestly, keeping supervisors and team members abreast of information they need to perform effectively.

Interactions with other team members deserve special mention. Teams make their best decisions by comparing ideas, a process that inevitably involves individual members proposing different plans or points of view. Hurt feelings and resentment can result if the subsequent discussions turn personal, detracting from trust between team members. Individuals, as well as team leaders, have a responsibility for keeping discussions and disagreements at a cognitive level, dealing with facts, rather than degenerating into attacks on persons. Supportive, positive attitudes are also linked to trust, cooperation, and higher performance in work teams.

Supervisors can work to both build trust in themselves and develop followers into trustworthy members of the organization. Trust building for supervisors consists of both do's and don'ts. The don'ts include behaviors that contribute to an overly controlling environment. Specific behaviors to avoid include berating, giving negatively charged feedback, micro managing, and controlling the conversational agenda. The do's include behaviors that encourage worker autonomy, including provision of non-judgmental informational feedback, ensuring that employees have the resources needed to be effective, and delivering on promised rewards. Supervisors are always under observation by followers, and being aware that behavior towards out-group persons will influence in-group opinions can help establish the needed level of consistency. For some supervisors, trusting employees may involve an

uncomfortable leap of faith, especially in organizations that have developed a culture of control and secretiveness.

Organizational policies and processes also play a role in establishing a culture that supports trust.

Transparency is an important consideration at the organizational level related to trust. The opposite of the consistency component of trust is uncertainty, and transparency reduces uncertainty about organizational processes. Transparency affects the effectiveness of rewards, including promotions and monetary rewards. When the processes for distributing rewards are secret or opaque to employees they may respond with mistrust. Transparency in communications and decision making are other well-recognized factors, with application at all levels in the organization. Project managers as well as executive leaders build confidence when their decision processes are communicated and understood.

Organizations can also take action to reduce the barriers between in- and out-groups. Human resource professionals may work to establish a pro-diversity workplace through awareness and education programs. Outreach through sponsorship of events, such as multi-cultural social gatherings, and recognition of the contributions of minority groups are other recommended activities. Human resource departments can also be vigilant for incidents of unfairness and conflict, both resulting from in-out group conflict and related to organizational processes. On project teams, the PM usually wears the human resources hat, along with their other responsibilities. As a team leader they should be conscious of the need to lower barriers by respecting and encouraging out-group members to play an active role in planning, decision making and strategy execution.

Trust is important because it has a real impact on organizational performance in terms of both efficiency and effectiveness. It also dovetails with other areas of importance to organizations such as leadership and high-performance human resource development. It is an expression of values with application at the individual, supervisory, and organizational levels and helps allow project teams to rise to their potential.

The author can be reached at **stanley.emelander@us.army.mil.**

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Software Acquisition: Reducing Risks

James Jones

The Acquisition Risk Crisis

The GAO has shown that technical, cost, schedule, and performance risks are inherent in delivering software-intensive systems. The GAO also reported that FAA acquisition programs have consistently experienced cost, schedule, and performance problems attributed to systemic management issues. Various authorities and the GAO have concluded that there is insufficient knowledge and skill to effectively manage the life cycle of those systems where software plays a significant role. Software acquisition and development have always presented challenges due to such factors as software estimation, design constraints, acquirer lack of experience, and supplier lack of institutionalized software development capability maturity. Cost overrun is the single biggest risk because it represents time, money, and missed opportunities. The difficulty in estimating costs is attributable to inadequate software size estimates and requirements growth. Poor software size estimation is one of the main reasons major programs fail to meet deadlines. Software size is the critical factor in determining cost, schedule,

Jones *is a DoD software acquisition subject-matter expert at Support Systems Associates, Inc. He has software experience in acquisition, development, and process improvement and holds two patents (4,479,034: 4,451,702).*

and effort. Software sizing is typically driven by the contract and the supplier software development capability maturity.

My Software Acquisition Journey

My software acquisition journey includes providing advisory and assistance services and software subcontract management for major defense acquisition programs (MDAP). These MDAPs experienced cost and schedule overruns. One MDAP experienced three "Nunn-McCurdy" unit cost breaches. Prior to my serving as the software subcontract management lead, thousands of subcontract data requirement deliverables requiring approval by the prime were 6 months to 2 years overdue. Approval was achieved prior to FAA type certification.

FAA procurement comprises over 200 acquisition programs. I provided systems engineering and integration services such as system development manager, software lead, on-site support, and software subject matter expert. Several programs experienced cost and schedule overruns, performance, and terminations for convenience and default. I was deposed by the supplier. One major cornerstone of the FAA experienced cost increases from $3.6 billion to $7.6 billion and required restructuring. However, I was involved with two very successful major programs. As the software lead, the supplier delivered the first production unit 6 months ahead of schedule and received a $9 million incentive award. The other program ($1.3 billion) achieved 100% on-time delivery of all systems.

Five Key and Effective Software Acquisition Elements

Based on previous acquisition experiences, I will discuss five key and effective software acquisition elements that result in reducing risks and improving the acquisition outcomes.

- Software Contract Requirements
- The Acquisition Environment
- Technical Performance Assessment
- Software Acceptance
- Performance Measurements

1. Software Contract Requirements

The degree of interaction between the acquirer and supplier depends on the nature of the development effort and the contract type. Although there are many variations, the two basic compensation schemes are fixed-price and cost-reimbursement. To provide an effective software acquisition environment, appropriate software contract requirements must be communicated to the supplier in the request for proposal (RFP). Success of an acquisition is directly linked to the quality of the RFP. During the RFP preparation, the acquisition team must have software acquisition expertise to ensure that essential software data and data rights are acquired.

Software must be addressed in the following RFP essential elements:

- Section L and Section M
- Statement of Work (SOW)/Statement of Objectives (SOO)
- Contract Data Requirements List (CDRL)
- System Specification
- Data Rights

Section L and Section M

Section L (instructions) should instruct the following software data to be submitted: 1) draft software plans (i.e., software development plan, software configuration management plan, and software quality assurance plan), 2) description of previous software development experience of similar systems, and 3) description of the software process defined in the draft software plans. Section M (evaluation factors) should contain district discriminators for software requested in Section L. For example, the government will consider the offeror's plans for conducting the software development and capability maturity.

Statement of Work/Statement of Objective

The Statement of Work (SOW) or Statement of Objective (SOO) is the "linchpin" of the contract. It defines the tasks required to successfully supply the software. The SOW/SOO must provide sufficient detail to allow the supplier to scope the effort, cost it, and provide a technical solution.

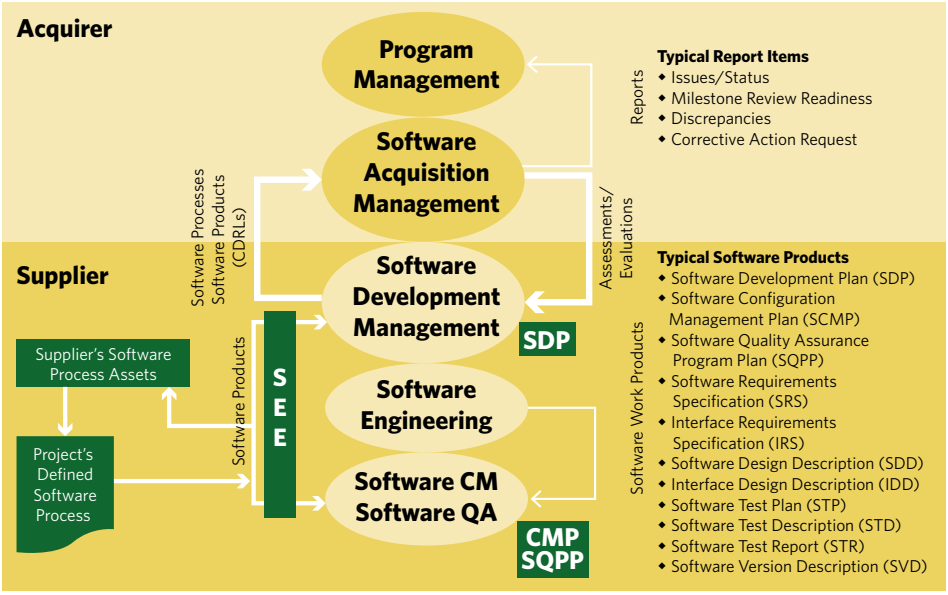
The SOW/SOO must contain software tasking information which should reference any applicable CDRL item that will be delivered by that task. Task should include updates of software plans as CDRLs, subject to acquirer review and approval. While the SOW/SOO states the specific tasks to be performed, it must not tell the supplier how to do the required work.

CDRLs

CDRLs are absolutely essential for managing the development process. Software CDRLs are a natural by-product of the development process to capture results for each software development activity. The *Defense Federal Acquisition Regulation Supplement* requires the use of a CDRL in solicitation when the contract will require delivery of technical data. CDRLs should be used only to acquire software data and rights which are essential to meeting the needs of the requiring organization. CDRLs must be referenced in the SOW paragraphs describing the software effort and preparation of software data. SOW takes precedence over the CDRL in a contract. Therefore, it is essential that the language in the SOW be consistent with and does not conflict with the CDRL in any way. Special data provisions (e.g., data rights and warranty if required) should be identified in the contract via special contract clauses.

Each CDRL identifies a data acquisition document data item description (DID). The DID defines the data the supplier is required to provide, along with delivery instruction. Assist Quick Search should be used to access the current DID. The DID selected should be used as is, or with non-applicable requirements tailored out (i.e., data requirements cannot be added to, only tailored out of a DID). Tailoring instructions (e.g., "BLK: Delete paragraphs...") are entered in the remarks section (Block 16). The DID should be referenced

Figure 1. Acquisition Environment



SDP: Software Development Plan
SEE: Software Engineering Environment
CMP: Configuration Management Plan
SQPP: Software Quality Program Plan

by the exact identifier and title with reference to any issue or revision identifier.

CDRL submission should be associated with events such as technical reviews (Quality Gates) in accordance with the CDRL item blocks. CDRLs should be delivered prior to the event to allow: 1) the acquirer sufficient time to perform a detailed review and provide review comments, 2) the supplier to disposition review comments, and 3) the acquirer and supplier to agree on the disposition. It is absolutely critical that the acquirer time for review and acceptance/rejection be specified in Block 16. All software CDRLs should be prepared by the software acquisition management team, reviewed by all applicable distribution addressee organizations and approved by either the appropriate acquirer program manager or data requirements review board chairperson prior to action by the contracting officer.

With the SOO approach, a list of CDRLs is proposed tailored to their design. The proposed CDRLs are then evaluated by the acquirer during proposal evaluation.

System Specification

The system specification is used to establish top-level technical performance, design, development, integration, and verification requirements. Software development constraints (e.g., methodology and safety-critical constraints) should be included. Sound system requirements are the backbone for accurate performance parameters—essential to the development of effective capabilities.

Data Rights

Data rights are of great importance to both the acquirer and the supplier. The acquirer must have sufficient rights to enable the use, maintenance, and replication of the software data. The supplier wants to ensure that its proprietary rights for software developed at company expense are protected in order to maintain its competitive advantage. Data rights categories include: unlimited rights, acquirer purpose rights, and restricted data rights. The secretary of the Air Force has directed the acquisition of technical data and associated rights to be addressed in all acquisition strategy plans.

2. The Acquisition Environment

Software-intensive system acquisition involves a number of organizations, including the user, the acquirer, and the supplier. Figure 1 depicts the acquirer/supplier relationships. The degree of interaction depends on the development effort and the contract type.

Acquirer

The acquirer program manager (PM) has full authority, responsibility, and resources to execute the acquisition program. The appropriate business function groups—finance, contracts, and legal—should establish and monitor the terms and conditions of the contract. During the establishment of the contract, the acquisition team must consist of a software acquisition management (SAM) integrated product team (IPT). A software acquisition manager should be designated to be responsible for all software acquisition activities and products. The manager should have software acquisition experience and coordinates with other affected parties such as the PM, contracting officer, and finance.

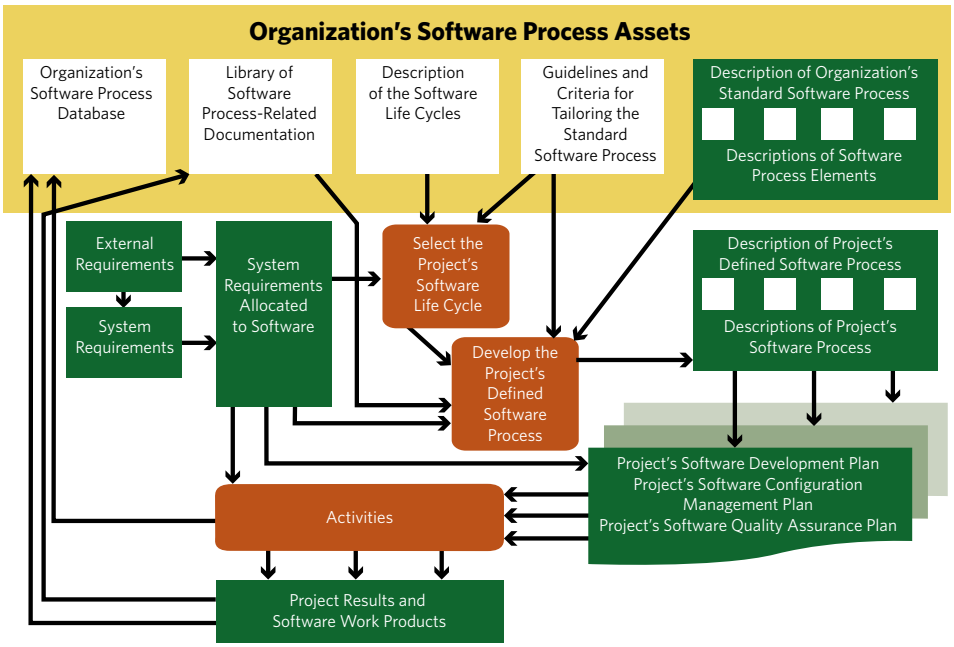
The SAM IPT must have adequate resources and funding. Members should be trained to perform the acquisition activities and receive orientation in the technical aspects of the program. The SAM IPT must recognize quality work before they can require and accept it.

Supplier

The supplier software IPT should be headed by a software manager who is responsible for planning, managing, tracking, and oversight. The manager should be the single point of contact for the acquirer software manager. The manager should provide visibility into actual progress so supplier senior management and the acquirer software manager can take effective actions when the performance deviates significantly from the plans. The software IPT should consist of a software process group, software engineers, software configuration management, and software quality assurance. The software

process group must establish and maintain a set of software process assets. Figure 2 illustrates the supplier process definition. The program software process should be developed by tailoring the organization's standard software process. A software life cycle model should be selected from among those approved by the organization to satisfy the program contract requirements and operational constraints using the guidelines established by the organization. After the program software process is established, the supplier should develop the software plans. Software plans should be updated based on events or phase-dependent.

Figure 2. Typical Software Process Definition



3. Technical Performance Assessments

Technical performance assessments enable the acquirer to determine accuracy and adequacy of the supplier process, progress, and CDRLs. It provides measurable results for determining effectiveness of the process and CDRLs quality.

The technical performance assessments are:

- Process Assessments
- Progress Assessments
- CDRL Review

Process Assessments

The acquirer should conduct process assessments to verify that software management, software configuration management, and software quality assurance activities and products are in compliance with contract requirements, the supplier process, and plans. Results should be analyzed to detect issues and to identify risks. The contract should provide a mechanism allowing the acquirer to access the supplier process and plans.

Progress Assessments

Progress assessments, using reviews, should be conducted to determine status, surface issues, and provide feedback to the supplier. The key focus should be what is done and the product being built. There are two general types of reviews: formal and informal. Formal reviews, such as technical reviews, should be defined in the contract. Informal reviews are conducted by the supplier—peer reviews and walkthroughs, for example.

Formal reviews should be structured around well defined procedures and objectives and coupled with realistic program events. Technical reviews (e.g., software requirements review) should directly support the software development process and provide the acquirer insight into the development status and CDRL quality. Technical reviews should be used as quality gates. The completion of software activity and associated CDRLs should be a prerequisite for the technical reviews. The acquirer and supplier should agree on CDRL maturity (preliminary, draft, final) and the technical review entrance/exit criteria.

CDRL Review

CDRLs are essential for managing the development process and delivery of quality software. Prior to exiting each development phase, the supplier should perform CDRL peer reviews and place the CDRLs under software configuration control prior to delivering to the acquirer. The acquirer should perform a detailed review providing review comments and/or recommendations in accordance with the acquirer CDRL review procedure. It is critical that the acquirer time for review and acceptance/rejection be specified in the CDRL.

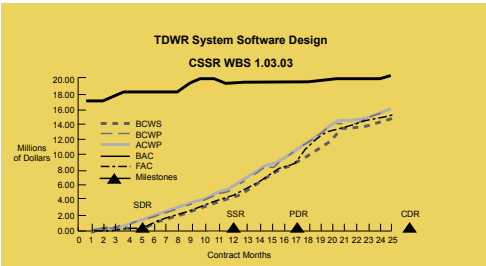
4. Software Acceptance

The development of software involves a series of production activities within which opportunities for human induced software errors are enormous. Because of this likelihood, the development process is accompanied by software testing, a quality assurance activity. There are typically three levels of software testing performed by the supplier: Unit testing, integration, and formal qualification testing (FQT). Unit and integration testing are conducted in accordance with the supplier process, and plans.

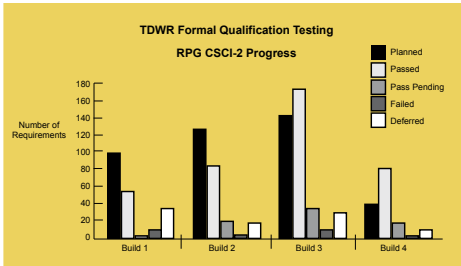
FQT is performed to evaluate the "as-built" software against the software requirements to ensure that the probability of failure due to latent defects is low enough for acceptance. FQT should be specified in the SOW with CDRLs. The supplier

Figure 3. Examples of Performance Measures

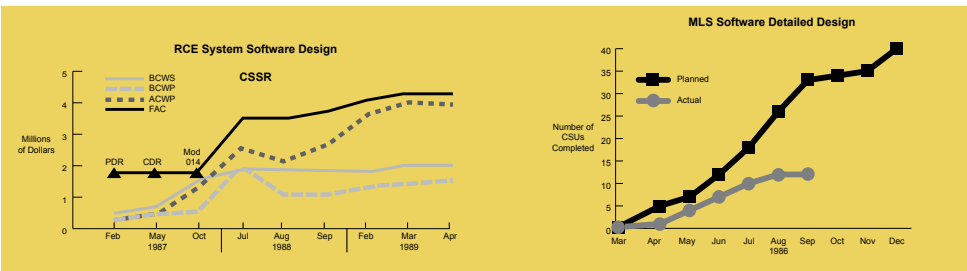
Cost/Schedule Deviation



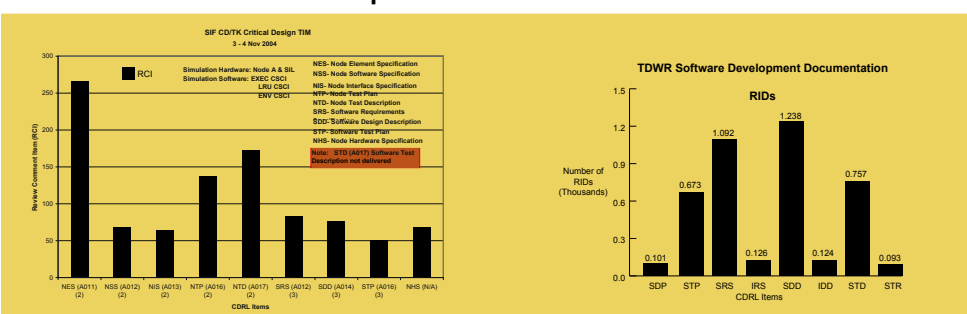
FQT Progress



Development Progress



Document Review Item Discrepancies



should document testing criteria, regression testing strategy, and acceptance criteria. Tests should be traceable to the software requirements. The supplier should document test cases and procedures.

Prior to FQT execution, the supplier should establish test readiness criteria and document the "as-built" software. The acquirer and supplier should agree to proceed to FQT execution. Upon agreement, the supplier should execute the tests in accordance with test procedures and capture the execution activity via test logs. Acquirer and supplier software quality assurance should witness all FQT execution. After FQT execution, the supplier should document test results indicating any problems detected.

Problems identified during FQT should have priority classification and should be tracked to closure. The supplier should establish a change control system to implement software changes identified during FQT, peer reviews, and approved acquirer comments. The change control system should provide how many problems have been reported, how many problems are pending, and how many problems are closed, as well as the progress of each problem.

Considering that complete test coverage is generally not possible, the acquirer and supplier face a difficult question in deciding when to release the software. The acquirer and supplier should agree on completion criteria. Prior to software acceptance, the acquirer should conduct functional and physical configuration audits to establish a product baseline.

5. Performance Measurements

Performance measurement is essential to managing and producing quality software. Software development is often out of control; you cannot control what you cannot measure. Better process management can be achieved if the attainment of cost and schedule targets and the quality of the software can be qualitatively measured. The acquirer and supplier should use performance measurements as quality indicators (metrics) to augment conventional acquisition and development reports. As mandated by Section 804 of the National Defense Acquisition Act, "metrics for performance measurement and continual process improvement" are a requirement.

The acquirer and supplier should mutually agree on and implement selected performance measurements. Examples of performance measurements are shown in Figure 3. As shown, over 4,000 review item discrepancies were identified, which contributed to FAA success.

Reducing Software Acquisition Risks

Studies have shown that technical, cost, and schedule risks are inherent in delivery of software-intensive systems. Five key and effective software acquisition elements can reduce risks, but reducing software acquisition risks requires assiduously detailing software contract requirements and applying knowledge and skill acquirer and supplier with capability maturity, effectively assessing supplier technical performance through process, progress, and CDRL review to measure effectiveness and compliance. Reducing risk also requires ensuring the "as-built" meets requirements, and determining progress toward objectives through performance measures.

The author can be contacted at **jjones@ssai.org.**

The Goal of Defense Acquisition

Lt. Col. Dan Ward, USAF

Time In Gym: Not the Best Goal

I recently asked a couple of dozen colleagues an apparently simple question: "What is the goal of defense acquisition?" Their responses were remarkably diverse. Some people emphatically asserted the answer was simple and sent me short goal statements. Others insisted the question was complicated and submitted lengthy replies. A few jokers sent answers that shouldn't be published here, even though I confess they made me laugh. As I perused the stack, it was interesting to see so many different perspectives. Interesting, but also a little disturbing.

Ward *is a branch chief in the Science, Technology and Engineering Directorate, Office of the Secretary of the Air Force for Acquisition (SAF/AQRT). He holds degrees in systems engineering, electrical engineering, and engineering management. He is Level III certified in SPRDE, Level III in PM, and Level I in T&E and IT.*

Confusion about the goal causes counterproductive behavior which actually moves us away from where we want to go.

A goal is the organization's purpose for existing—the thing it was created to do. If the organization does not achieve its goal, it has failed. So the question "What is the goal?" is a fundamental one, and divergent goal definitions are a bad sign. Ideally, an organization's goal directs its activities and measurements and defines the very heart of organizational success. Without a goal, we don't know if we're doing the right thing or making meaningful progress. Of course, an organization may have multiple goals and sub-goals, but at the end of the day, there needs to be a single, over-arching, tie-breaker goal—a Most Important Thing, if you will.

Here's why this matters: Confusion about the goal causes counterproductive behavior which actually moves us away from where we want to go. So the fact that no two people proposed the same goal statement probably means we've got a problem.

The inspiration for this little research project came from Eli Goldratt's business novel *The Goal*. This book is widely regarded as the original source for the Theory of Constraints, but as the title indicates, the concept of goal identification is central to the story. In fact, goal identification just may be the most important concept in Goldratt's story, and indeed it is the pivot point for much of the novel's drama.

To be clear, the results of my admittedly unscientific experiment weren't entirely dissimilar. As you might imagine, many of the proposed goal statements included some variant on "achieving cost, schedule and performance objectives." But Goldratt's book argues strongly that such goal statements aren't quite right.

In *The Goal*, the main character (Alex) makes the startling observation that efficiently producing quality products is not the goal of a factory, nor is it to advance the state of the art of technology. Instead, he realizes that the goal of a factory is simply this: to make money, now and in the future. Goldratt argues that if a factory makes quality products efficiently but unprofitably, it's failed. If it uses or develops advanced technology but doesn't make money, it's failed. The only true success for a factory is to make money, because without profit, the factory won't survive.

This analysis began to cast a little doubt on all those acquisition goal statements that echo the "achieving cost, schedule, and performance objectives" concept. That type of goal sounds suspiciously like "efficiently produce quality products," which is firmly rejected in *The Goal*. I started to wonder: If efficient production of quality products is not the goal of a factory, maybe it's not the goal of the defense acquisition enterprise either. So I decided to take a closer look.

Imagine if the acquisition community efficiently delivered quality products that didn't line up with operational needs. That would be a failure, right?

Similarly, what if we meet the cost and schedule objectives, but they were too high in the first place, resulting in systems we can't afford? Or what if the development costs are on target but the operational costs are unsupportable? Clearly, a system can be "on budget" and still be an unaffordable failure.

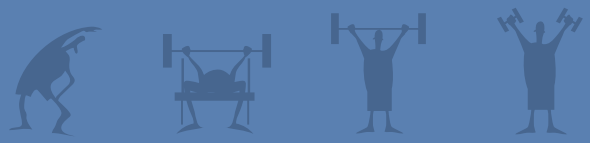
What if one program delivers on time and on schedule but drives all sorts of problems and delays into a dozen other programs? What if the delivered system can't integrate with the rest of the operational environment? What if we optimize one system at the expense of the larger system-of-systems? What if we improve engineering in a way that hurts logistics? Fail, fail, fail, fail.

Maybe we just need to adjust the goal statement. We could add lots of phrases like "in response to user needs" and "in an integrated fashion" to the cost/schedule/performance goal, ending up with a statement that is both more comprehensive and more cumbersome. Is the goal of defense acquisition to "deliver affordable, war-winning, sustainable, effective, integrated, compatible capabilities on-time and on-schedule, without driving expensive changes into the operational environment"? Or does even that phrasing leave out critical aspects? I suspect the solution isn't to pile on more phrases, caveats, and nuances. The longer the statement is, the more likely we haven't quite defined the goal yet.

Which brings us back to Goldratt's book. He argues that a factory's goal is "to make money, now and in the future." We may agree a factory is supposed to make money, but clearly, that is not the goal of acquisitions, at least from the government side. We're not in the profit business.

Just what sort of business is the acquisition community in? True, acquisition involves providing products and services, sort of like a commercial entity, but not for the purpose of selling them at a profit. Is there perhaps something we make instead

The question of the goal of defense acquisitions is not one for senior leadership to answer alone. The responsibility lies with us all, to seek to understand the goal. To ensure our activities and measurements support it. To ask the questions.



of money? Some greater goal? What if the thing we make, our equivalent to a factory's profit, is national strength?

Perhaps the primary goal of defense acquisition is this: make America stronger, now and in the future.

Let's test that thought. Is it sufficient to achieve that goal if we don't achieve any others? And are there any activities we could undertake in support of that goal that would ultimately be counterproductive?

The act of efficiently producing quality goods serves that goal, just as it serves a factory's profit motive. Delivering systems that work, meet genuine needs and can integrate with other systems also serves that goal. These sub-goals are important, but they can't be allowed to trump the main goal.

If we optimize a part at the expense of the whole, we could make the nation weaker, which does not support the goal. Keep in mind that counterproductive optimization of a part can be inadvertently justified using cost/schedule/performance goals, but we avoid this pitfall if we define the goal as making the nation stronger.

This does not mean the Defense Acquisition Workforce shouldn't care about efficiency, quality, or advancing the state of the art. A manufacturer can't ignore those things, either. It just means none of those activities are THE goal. And if those are not the goal, perhaps we need to take a closer look at the way we define and measure progress, at our metrics and our activities.

Let's step away from the factory metaphor for a moment. Instead of a factory, whose goal is to make money, we could consider a gym. What is the goal of exercise? Why do people work out? Sure, some people do it for fun, some for their mental health, some as a way to socialize and some just because they like wearing spandex. But imagine for a moment that a group of people decided their goal was to get fit (understanding that the generic concept of "fitness" can be defined in several ways). How would fitness as a goal shape their behavior? How would it shape the things they measure, monitor and track?

It is certainly possible to spend a lot of time in the gym and still be out of shape, so it would be pretty silly to use Time in Gym as a primary metric and expect that hanging around the smoothie bar will erase those love handles. Further, I could spend buckets of money on expensive gear, clothing, and equipment and still be a slug, so Money Spent on Fitness probably isn't a great metric either. I can have fun and socialize in the gym without getting any slimmer, stronger or swifter, so if fitness is the goal, then Number of Cool People Met and Enjoyment Level aren't great metrics or central activities either.

If the goal is fitness, doesn't it make sense to move our bodies around in particular ways, then, depending on the type of fitness we're aiming for, to measure how many pounds we've lost, how far/fast we can run, or how much weight we can lift? We could even get all scientific and measure stuff like resting pulse rates and blood pressure. Measurements like this indicate whether we're getting fitter, right? And if we don't see the results we were aiming for, it's time to find a different way to move our bodies, because the current motions aren't effective. I hear there's an opening in the spin class.

Keep in mind: Defining the goal as fitness doesn't mean you can't ever have fun, meet people, wear stretchy pants or spend money like crazy. It just means those things aren't the goal. In order to be meaningful, our metrics and activities must be connected to the goal, so those things shouldn't be at the heart of what we do or how we monitor progress.

If you ever read an airline magazine, you've probably seen advertisements for the ROM exercise machine, which promises to whip you into shape with a 4-minute workout. It only costs $14,615, which is apparently quite a bargain. I have no data and no opinion as to the veracity of the ROM claims. For all I know, the thing works great. Or maybe not. I only mention it because I can imagine some people might feel bad about spending that much money on a piece of equipment they'll only use 4 minutes a day.

I'd like to gently suggest that dollars spent divided by time used is a bad way to measure fitness—because it doesn't actually measure fitness. As we've seen, the amount of time and money you spend are unreliable indicators of how fit you're getting. The real question is whether or not the thing made you bigger, sleeker, or tougher. Or maybe you're just going for a lower

resting pulse. Again, "fitness" has many definitions, and we'll need to be precise with what we mean by that term. Once we've defined it sufficiently, it's important to make sure our activities and measurements are aligned with that goal.

Maybe the ROM isn't for me. Perhaps I can get an equivalent level of fitness by spending $15 on a pair of used running shoes and putting in countless hours on the track. That's where an analysis of alternatives comes in. If I've got plenty of time to work out and not a lot of spare cash, running might be the way to go. If I've got more money than I know what to do with and no free time then sure, buy a ROM. In either case, the thing to keep in mind is that the goal is fitness, not spending time or money.

While time and money are interesting aspects of the situation, there's no sense in trying to figure out if I got my money's worth in terms of dollars spent per hour used. The real question is whether I'm in better shape or not. Fitness per dollar or fitness per hour are both fine metrics. We could even get all mathematical and measure fitness per dollar-minute and compare multiple options. The key is to include the goal—fitness—in the calculation somewhere.

OK, back to defense acquisition. If the goal is to make America stronger, then the acquisition enterprise is sort of like a national gym. It's full of wonderful machines that target different parts of our metaphorical anatomy; some exercise our airpower biceps, while others exercise our seapower pecs, our spacepower delts, our ground-based quads, and our highly coveted Marine Corps six-pack abs. We even have stuff that make our cyberpower gray matter swifter and smarter.

As we use these machines to crank out new acquisition programs, it's important to ask a few critical questions: What is the goal? Do we have the right goal? Are our metrics and behaviors aligned with the goal?

The interesting thing is, the protagonist in Goldratt's book didn't so much decide his factory's goal as discover it. Like a Platonic form, the goal possesses a higher kind of reality, independent of whether it is explicitly recognized or accepted by mere mortals. Thus, the question of the goal of defense acquisitions is not one for senior leadership to answer alone. The responsibility lies with us all, to seek to understand the goal. To ensure our activities and measurements support it. To ask the questions.

I don't know if "Make America stronger, now and in the future" is really the right goal for the acquisition enterprise. For all I know, there's a much better goal statement out there, and maybe there's even a wide consensus on what that statement is. Maybe Goldratt is completely off-base, entirely irrelevant to defense acquisition, or both. Maybe efficient production of quality products is exactly the right goal. Or maybe not. I suspect Plato would agree it's a question worth considering.

The author can be contacted at **daniel.ward@pentagon.af.mil.**

SECTION 3685, TITLE 39, U.S.C. SHOWING OWNERSHIP, MANAGEMENT, AND CIRCULATION

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G. Total distribution: 22,729

Acquisition Leaders Honor a Life of Contribution:
Richard K. 'Ric' Sylvester

On Sept. 6, 2011, the Defense Acquisition Workforce was saddened at the untimely death of Ric Sylvester, who had served as interim DAU president in September and October of 2000.

Sylvester contributed 35 years of service to the nation in various roles, including deputy director of acquisition resources and analysis for acquisition management, deputy director for property and plant equipment, assistant deputy under secretary of Defense for acquisition reform, and deputy director for acquisition workforce and career management—all as a member of the Senior Executive Service in the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics. He began his career with the U.S. Army and spent a year as a legislative fellow on the staff of Sen. Carl Levin. At the time of his passing, he was vice president for acquisition policy at the Aerospace Industries Association.

A mentor to many and friend to many more, Sylvester forged many strong friendships at DAU and at many other institutions. To honor him, Defense AT&L reached out to a few of Sylvester's colleagues, who shared their fond memories of this leader and his contributions to the acquisition profession.

"Those of us who knew and worked with Ric also knew him for his passion for the work, his sense of team, and his humor."

Stan Z. Soloway
President and CEO, Professional Services Council
Former Deputy Under Secretary of Defense (Acquisition Reform)

★ ★ ★

"Ric [a University of Michigan alumnus] always had such a sharp wit and was such a rabid M-Go-Blue fan! He could finesse agreements out of the toughest groups and committees and often was given those specific jobs because everyone knew no one else could do it.

"Ric always delivered—whether it was in acquisition reform and coming up with truly new and innovative ways of doing business or with Industry in showing the benefit to both government and industry in seeking to implement new practices. Despite tough resistance, Ric could sell it, but then again, he didn't back losing ideas. He made sure that the concepts and innovative practices were really win/win for both Government and Industry. It is one thing to blindly salute and execute, but that wasn't Ric. Ric always took the idea and made it better so that it would work for all sides. That's probably how he was able to negotiate agreements where others failed. He genuinely heard both sides and developed mutually beneficial solutions.

"Ric was a giant in federal service, whether it was working as a government employee or as a defense contractor. He never lost sight of the goal to safeguard the benefit to the U.S. taxpayer. There hasn't been anyone before and there will not be anyone after who will be able to rival his style and ability to get things done, and done well. He will be missed. And he will not—ever—be forgotten."

Craig Curtis
Former DoD Procurement Analyst, DHS Contracting Career Manager

★ ★ ★

"Although I never worked closely with Ric, I knew him for many years and would call him and talk with him on occasion. I first met him when I was a young Army captain back in the early

'70s, just getting my feet wet in the acquisition business. I was working on armored and automotive systems in combat developments at the Armor Center at Fort Knox. I was on the team working the requirements for the new Army tank—which became the Abrams. I wrote the first operational test for the Abrams and had to obtain approval for the test through all of the major Army commands, to include the Tank Automotive Command (TACOM) at Warren, Mich., and all the way up to the G-3 (then ODCSOPS) in the Pentagon. Ric was at TACOM back then—my guess is he was a GS-12 or 13—and worked with me on Abrams as well as other tank and automotive issues. He was always very helpful and really knew his business. I respected him very much. And yes, being so close to Ann Arbor, you can bet he wore his university's gold and Navy blue very proudly!"

Wayne Glass
DAU Program Director, Strategic Partnerships

★ ★ ★

"Rick was the ultimate professional, who cared deeply and worked every day to make a difference. He was both tough and compassionate. He worked hard, had a great sense of humor, and was always thoughtful. Even when you disagreed with Rick, you always respected him. He was a great leader, a great friend, and will be deeply missed."

Frank J. Anderson, Jr.
President, Strategic Public Sector Solutions, LLC
DAU President, 2000-2010

★ ★ ★

"It was an honor to have Ric work for me, and he was very good in both the acquisition management and the plant, property, and equipment jobs he did for ARA. He is, and will be, terribly missed."

Nancy Spruill
Director of Acquisition Resources and Analysis,
Office of the Under Secretary of Defense for Acquisition,
Technology and Logistics

★ ★ ★

"Ric was my deputy and teammate for over nine years in OSD and my dear friend for almost 18 years. From the first day I met Ric, I was impressed by his honesty and his straightforwardness. But very soon I also I admired him for work ethic, determination, teamwork, loyalty, intelligence, capability, and his 'can do' attitude. There was nothing Ric couldn't or wouldn't take on in acquisition reform and acquisition initiatives. He loved his work, and he loved working hard to make a difference for all those he served—particularly our military men and women: our warfighters and all those that support them through acquisition, technology, and logistics support.

"He was a true patriot and warrior himself, trying to make things better in the DoD and proudly served our nation for his entire adult life—as a young man working for the Army in Germany, then in OSD, and [later] as a defense contractor. Ric was talented and knowledgeable and shared his talent, knowledge and experience with all those he worked for or by mentoring program managers as well as those that worked for him.

"Ric taught us so much. He taught us to work hard, but make it fun, and play hard. He always made time for his loved ones, Mary, Christy, Kim, Dave, and his grandchildren that he loved dearly. He also taught us what real courage is as he took on his battle to beat cancer. He helped so many of us by sharing his feelings and challenges as he made his final journey, trying to make it easier on us all. We could not make things better for him except to let him know that we were thinking of him with positive thoughts, sending caring thoughts, prayers and our love. Ric fought his battle with courage, determination, grace, and humility. He did all he could to get well, but he also taught us through his faith how to accept what we must. The world is better because of Ric, and I am grateful for having known him. I will miss my dear friend very much."

Donna Richbourg
Former Acting Deputy Under Secretary of Defense
(Acquisition Reform)

★ ★ ★

"Ric recognized the value of the acquisition workforce, and he worked to enable them to be more effective and to have successful careers. He was president of DAU in an interim capacity during 2000, as he often proudly reminded his colleagues. Many faculty and staff remember that time as a turning point between the DAU of the 1990s and what it was to become in the next decade. Ric was an early and persuasive advocate for expanding DAU's products beyond the classroom to helping the workforce perform on the job. Examples include continuous learning, knowledge sharing, and 'Ask-a-Professor,' which have grown into mainstays of the university's offerings. We remember him as a dedicated public servant, a powerful intellect, a caring person, and a friend."

Jim McMichael
Vice President, Defense Acquisition University

★ ★ ★

"Ric Sylvester, with strong character and determination, made monumental contributions to the defense acquisition community. He effectively mentored his teams with a sense of purposeful accomplishment and maintained a collegial environment, rich with pride and enjoyment. We will always cherish our many discussions regarding acquisition reform and initiatives for excellence. Enduring is his message of importance, 'I am blessed with a loving family and good friends, who could ask for more.'"

Paul T. McMahon
Deputy Director for Administration, Executive Secretariat
OSD (AT&L)

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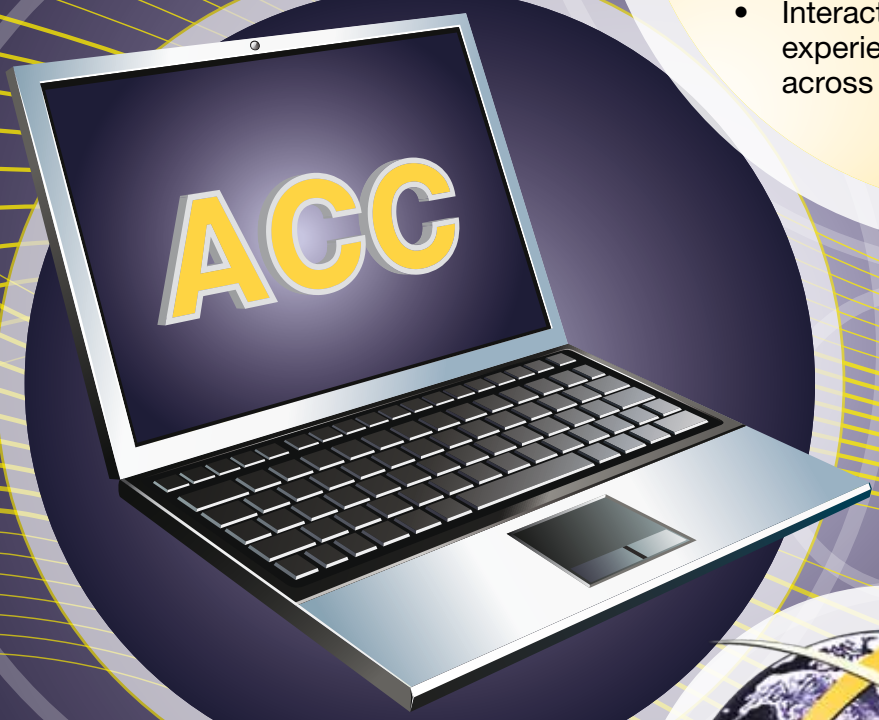

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Defense AT&L

Writers' Guidelines in Brief

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(at)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.

Receipt of your submission will be acknowledged in five working days. You will be notified of our publication decision in two to three weeks. All decisions are final.

Deadlines

Note: If the magazine fills 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 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 suited to DAU's journal, *Defense Acquisition Research Journal (ARJ).*

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Articles should be 1,500–2,500 words.

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