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ACQUISITION

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APOLLO

50 NEXT GIANT LEAP

Project Apollo

Celebrating 50 Years of Enduring Acquisition Lessons

**Always Remember
What's at Stake**

**Awarding the Best
Value Solution**

**Simulations Versus
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Project Apollo

Celebrating 50 Years of Enduring Acquisition Lessons

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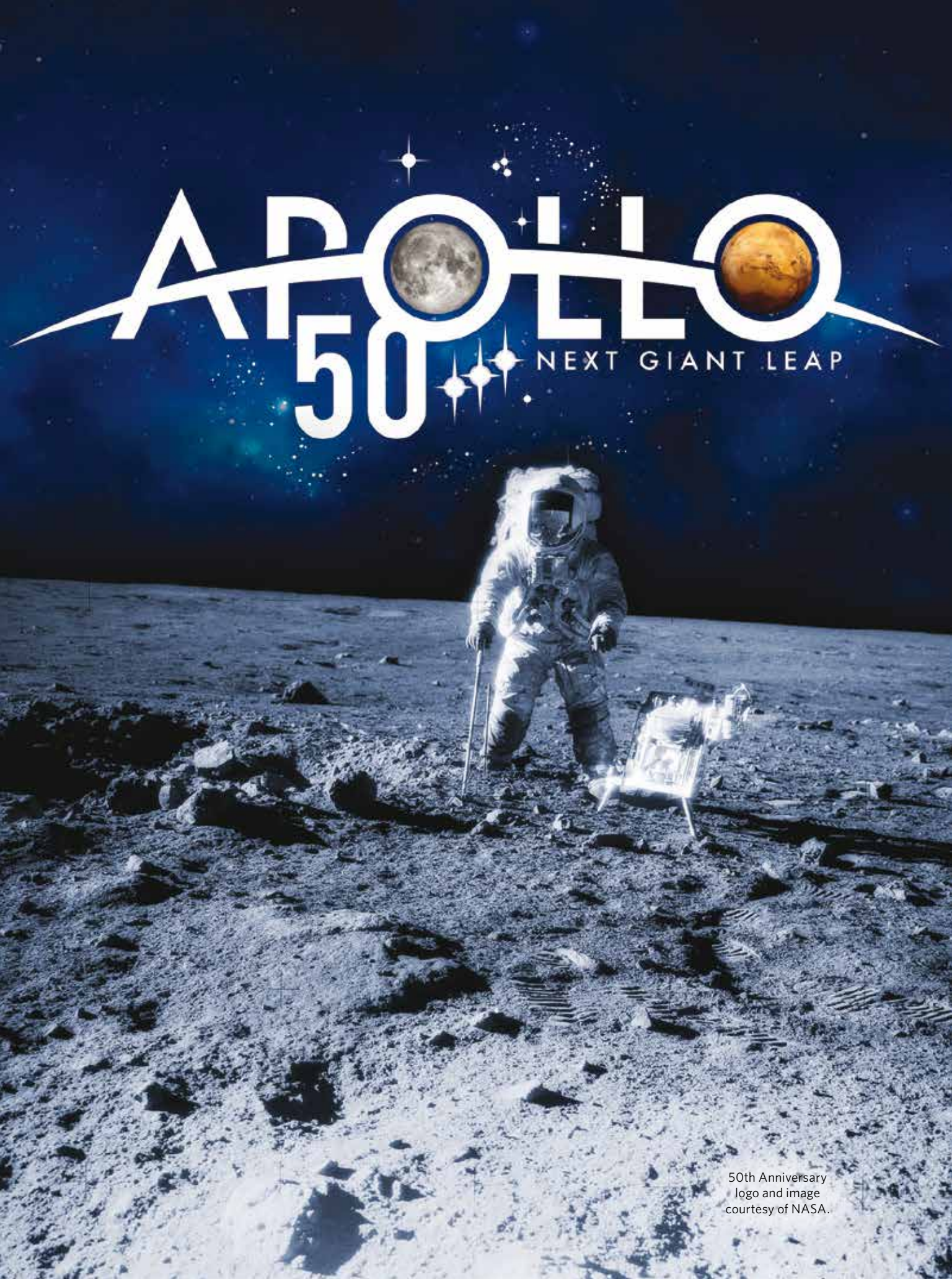
JULY 20, 1969: APOLLO 11 LANDED ON THE MOON! AS WE PAUSE TO reflect on the magnitude of this significant historical event, we find numerous lessons that directly relate to our success in acquisition today. Certainly, the basics of teaming, such as communication, trust and conflict resolution had to be in place. However, this effort required far more than the basics. In the parlance of Navy CAPT L. David Marquet (Retired), author of *Turn the Ship Around*, this effort would require the tenets of “Intent Based Leadership (IBL).” IBL is the abandonment of the traditional “leader follower” construct, and instead pushes for creation and “emancipation” of leaders at every level, learning from their mistakes, persevering in the face of adversity and discovering what might be.

In this light, and due to their relevancy to current defense programs, we will explore five lessons, in no particular order, from Project Apollo that illustrate IBL and the ensuing perseverance it instills throughout the team: No. 1, independent variables are not free; No. 2, what was old is new again, by applying lessons from the past; No. 3, critical thinking yields pleasant surprises; No. 4, you cannot change reality but you can change your plan; No. 5, have a clear and meaningful goal.

To fully appreciate these accomplishments, we must explore them in the context of the U.S. space program in the 1960s. As the space program transitioned into Project Apollo following the success of the Mercury and Gemini programs, it was a rough start. On Jan. 27, 1967, during a “plugs-out” test of the spacecraft, on the launch pad, with the astronauts strapped in and sealed in the Command Module, there was a fire in what was later designated “Apollo 1.” The fire killed all three astronauts: Virgil “Gus” Grissom; Edward “Ed” White; and Roger Chaffee (numerous contributing environmental design factors are postulated to have caused the fire and resultant deaths of the astronauts).

This tragedy led to an almost 10-month period of recovery before the first full-up unmanned flight of the Saturn V rocket, in the form of “Apollo 4” (there was no Apollo

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APOLLO 50

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2 or 3, per se, as a result of the after-the-fact designation of spacecraft AS-204 as “Apollo 1” in honor and remembrance of Grissom, White and Chaffee). The first manned flight after the fire was not until Oct. 11, 1968, in the form of Apollo 7. The team’s ability to overcome this tragedy and the commensurate scheduling impact is amazing! President Kennedy set a goal of landing on the moon in the 1960s; in January 1967, less than 3 years before the end of the decade, a catastrophic fire killed three astronauts. On top of this, we had to figure out what went wrong—and fix it. This delayed the first manned Apollo flight until just 14 months prior to Kennedy’s deadline. Moreover, in this same short remaining timeframe, we had to prove out a brand new rocket and all the techniques and procedures to get it and the crew to the moon and back.

Five Key Challenges

At its peak, the Apollo program employed 400,000 people and required the support of more than 20,000 industrial firms and universities. Of the many challenges facing this enormous and professionally diverse team, the following five correlated with and provided the genesis of the five previously cited lessons.

Challenge 1. Determine Cost of Independent Variables

Just as we deal these days with the consequences of Cost As an Independent Variable (CAIV), Project Apollo had to deal with “Schedule As an Independent Variable” (established by President Kennedy). As the name implies, self-prescribed constraints to force efficiencies that might otherwise be unattainable, are mandated or forced into the area designated as the independent variable. Unfortunately, those efficiencies create equal if not exponentially larger inefficiencies in the associated dependent variables. In the case of Apollo, Kennedy’s prescribed schedule constraint drove cost increases to what can only be described as “astronomical” levels. Additionally, substandard workmanship and poor design, resulting from what became known as “go-fever,” is cited by many as the primary driver behind the performance failure resulting in the deaths of Grissom, White and Chaffee. Thomas Young (former Lockheed chief executive officer who many years earlier also worked as an engineer for Grumman, supporting development of the Lunar Module) alluded to the lesson for us today during his July 2005 testimony before the House Armed Services Subcommittee on Military Space Acquisition. He shared his belief that programs like “Better-Faster-Cheaper” and “CAIV” equate to trying to fit 10 pounds in the proverbial 5-pound bag. This is usually a recipe for disaster (i.e., the cost of the fix is much more than the cost of doing it properly in the first place). Independent Variables have their place, but we must make sure all stakeholders are willing to accept the resultant exorbitant inefficiencies incurred in the dependent variables.

Independent variables are not free.

Challenge 2. Exploit Lessons Learned

The first F-1 rocket engine exploded in its test stand. As engineers worked to design and build an engine with the necessary thrust to get everything required for a trip to the moon off the ground, the most powerful single-chamber rocket engine ever flown emerged from their drafting tables. They overcame numerous hurdles along the way. The biggest among them was combustion instability. Like a candle flickering from side to side as it seeks oxygen to burn, the single chamber F-1 engine multiplies that flicker into 1.5 million pounds of exploding thrust (the previous front runner at just over one-tenth of that power, the H-1 engine, came in at a mere 165,000 pounds of thrust). The unstable combustion of the fuel haphazardly bounces and jumps to consume every bit of oxygen in the chamber, generating large chaotic forces that would actually shred portions of the engine. The fix was figuratively and literally “baffling,” in that order, with a lot of Critical Thinking before finding a fix.

At first, the engineers did not know what to do. If they could not eliminate the combustion instability, this was a show-stopper. As a last resort, they explored why the problem did not manifest itself on previous engines, even if on a smaller scale. They compared their design to the V-2 rocket technology brought over with the German scientists after World War II. The difference was clear: The V-2 had a series of showerhead-like injectors that evenly distributed the fuel, allowing for stable combustion throughout the chamber. The F-1, on the other hand, had only a single large flat injector plate. Not wanting to redesign the entire injector system, the engineers replicated the effect of the V-2’s multiple injectors by installing baffles to divide the injector plate. This balanced the fuel distribution as it entered the combustion chamber and stabilized the burn.

Experience, including both successes and failures, is a great resource for solving what we may initially perceive to be new problems, when those problems actually are rooted in known principles. The problems often are masked by the complexity of new approaches due to differing requirements or scaling issues. In the case of the F-1 and the lessons from the V-2, engineers recognized the value of documenting lessons learned and bringing the fruits of previous discoveries forward as solutions for today.

What was old is new again, by applying lessons from the past.

Challenge 3. Think!

Insulation on the hydrogen fuel tanks was failing. Engineers applied a vacuum-sealed honeycomb insulation material to the exterior of the hydrogen fuel tanks used to power the five J-2 and single J-2 engines on the second and third

stages, respectively. This kept the hydrogen from boiling in the Florida heat. Try as they might, the honeycomb insulation kept popping off the tanks. They knew they were doing something wrong, but they were not sure what. With the manufacturing facility located on California's Seal Beach, the engineering team, capitalizing on their geographic proximity, recruited some improbable experts that just might be able to help: Surfers! Surfers used honeycomb cores to create and repair their surfboards because of the lower weight and higher strength than traditional foam and fiberglass boards. They were hired—and they did a great job applying their unique expertise to resolve the problem. The only drawback was high absenteeism when the surf

resources and capabilities available to contribute to the overarching objective, and then devised and communicated a plan to execute those resources.

You cannot change reality, but you can change your plan.

Challenge 5. Establish Clear and Meaningful Goals

Although Low is well known for his revising and championing Apollo 8's mission modification, perhaps equally important he also is credited by many for suggesting the establishment of a national goal of landing on the moon. He started proposing the idea to President Eisenhower in

... programs like “Better-Faster-Cheaper” and “CAIV” equate to trying to fit 10 pounds in the proverbial 5-pound bag. This is usually a recipe for disaster (i.e., the cost of the fix is much more than the cost of doing it properly in the first place).

was up. This is a great example of thinking critically, and using divergent thinking to realize a way to use an existing and available resource in a new and creative way.

Critical Thinking yields pleasant surprises.

Challenge 4. Adjust and Adapt to New Information

By August 1968, it was clear the Lunar Module would not be ready for its planned maiden voyage as part of Apollo 8. Nevertheless, to George Low, an engineer assigned as the head of NASA's Office of Manned Space Flight (OMSF), it was equally obvious that the redesigned Command Module was on track. Instead of focusing on what “couldn't be done,” Low put his thoughts and efforts into “How can we advance the program with hardware that is ready now?” Although the Lunar Module would not be ready to test in Earth orbit in December 1968, the rest of the Apollo 8 stack was ready, and it had everything required to get the astronauts to the moon! After many meetings and much debate, Apollo 8 would orbit the moon in December 1968. By adjusting beliefs and plans based upon new information, the 1969 moon landing by Apollo 11 became a reality. Bob Gilruth (another groundbreaking space engineer) cited Low's plan as “a stroke of genius.” Low considered all the

the late 1950s, but it did not get traction until Kennedy was elected, and then it was immortalized in Kennedy's May 25, 1961, speech to Congress and the nation:

I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to Earth. No single space project of this period will be more impressive to mankind, or more important to the long-range exploration of space, and none will be so difficult or expensive to accomplish.

This goal met the essential “SMART” criteria initially prescribed by management guru Peter F. Drucker in 1954. Although the terms have been adjusted slightly over the years, the essence of the meaning is the same. It is Specific (land a man on the moon and returning him safely to Earth), Measurable (succeed or fail), Attainable (Kennedy asked his staff engineers to determine what is realistic before he prepared and delivered the speech), Relevant (political and national relevancy), and Time-bound (before this decade is out).

George Low knew, and President Kennedy realized too, that Drucker got it right!

Have a clear and meaningful goal.

Persevere

Again, many factors came into play and we should embrace all of the lessons born from the unrivalled achievement of our journey to the moon. These are just five lessons from among the many, and through each of them, there is the common binding thread of perseverance, spun from the principles of Intent Based Leadership. This lesson is demonstrated by the perseverance of Dr. Robert Goddard, recognized as the "Father of American Rocketry" credited with creating and building the first liquid-fueled rocket. Many people chastised and belittled him for his innovative and far-reaching ideas. In fact, a 1920 *New York Times* editorial stated: "... he only seems to lack the knowledge ladled out daily in high schools."

On July 17, 1969, as Apollo 11 streaked toward the moon through the vacuum of space, the *Times* retracted the editorial printed 49 years prior. Dr. Goddard did not live to read the retraction, but he did persevere in the face of the original condemnation. Likewise, perseverance overcame the tragic cost of schedule as an independent variable and

the resultant "go-fever" that led to the loss of astronauts Grissom, White and Chaffee. Perseverance led a team of engineers to resolve the F-1 combustion instability by adopting and adapting proven techniques from the past. Perseverance steered that same team to recruit surfers to help them fabricate effective and reliable insulation for the Saturn V fuel tanks. And perseverance allowed George Low to inspire a president to commit this nation to the goal of landing a man on the moon, while at the same time convincing those carrying out the plan to remain flexible in their strategy to reach that goal.

It is the same for us today, successful teams persevere every day, even in the face of adversity, by setting clear and meaningful goals, adapting their plan to reality, thinking critically and exploiting all available resources, remembering and applying the lessons of the past, and by designating only realistic and acceptable independent variables.

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Always Remember **What's at Stake**

*LTC Ramsey Oliver, USA
Maj Erin Brilla, USAF
Capt Miguel Vallejo, USAF*

AQUISITION PROFESSIONALS OCCASIONALLY ARE ACCUSED OF BEING DISCONNECTED FROM THE battlefield—fighting the good fight in cubicles, on spreadsheets and in lab simulations. This mentality can leave program offices feeling far removed from the proverbial “tip of the spear,” especially when they are supporting programs that are years away from final fielding of capability or lacking a source of feedback from the field. The foundational importance of the work for the warfighter is clear; nevertheless, the close targets often become Program Executive Office (PEO) execution reviews, congressional staffer requests for information, and quick-turn budget drills. Often, all it takes is one desperate call from a soldier downrange to shift perspective, disrupting the seemingly comfortable program office tempo with the powerful reminder of the operational impacts of shrewd acquisition acumen.

Members of the Acquisition Corps often measure success in the form of obligation and expenditure rates, key performance parameters, operational tests or on-time deliveries. The end users of the product measure success in terms of enemies captured or killed, battles won or avoided, and overall mission accomplishment. At the U.S. Special Operations Command (USSOCOM), the program office is integrated and acutely aware of the impact of its contribution to success

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or failure. This article hopes to inspire other acquisition professionals to remember what is at stake and the importance of buying smarter, to reinvigorate the critical link between “business as usual” and the “tip of the spear.”

The Modi Electronic Countermeasure (ECM) system, produced by Sierra Nevada Corporation, began fielding to Special Operations Forces (SOF) in 2016. The Modi system is an Acquisition Category (ACAT) III program of record that consists of a man-portable backpack providing protection against evolving radio-controlled Improvised Explosive Device (IED) threats. As new threats emerge, new capability gaps are discovered in combat requirements, and information about them is sent directly from deployed units to USSOCOM’s PEO SOF Warrior and the Counter-Proliferation (PMCP) program manager, eliminating as much bureaucracy as possible between operator needs and the subject-matter experts who can identify the solution.

In the ECM portfolio, PMCP typically is able to respond to combat mission needs nearly in real time. Think of it as “just-in-time fielding,” which requires continuous updates to the Modi deployment plan and rapid delivery of each new system in response to the changing battlefield. With SOF operators embedded in the program office and requirement shops, feedback from the end users is never more than a phone call away. As new systems roll off the production line, operational needs and headquarters priorities are evaluated continuously, and new systems are delivered to the units that need them most. For SOF acquisition professionals, there is a very intimate and immediate connection with the SOF end users’ needs, its agile acquisition process structure and the empowerment and flexibility to respond accordingly.

In 2018, the Modi system was entering its fourth production cycle and the program office made a commitment to purchase 106 systems for its customers. However, when the initial proposal for the fourth production lot arrived from the prime vendor, the office was shocked to see a drastic 50 percent increase in the cost per unit over the previous purchase. At the new proposed price, it would be impossible to field even half the systems as originally promised. This was not acceptable. Any scenario that would result in a phone call to units downrange to inform them they would not receive the systems this year was a non-starter. The plan was to purchase and field 106 systems, and 106 systems it would be.

Exploiting Economies of Scale

The first step, in an effort to contain cost growth and provide maximum flexibility for future procurements, was to ask the prime vendor to provide a stepladder fixed-price structure through Fiscal Year 2021 in order to identify potential quantity price breaks and guarantee locked-in

pricing for the next 3 years. With this new price structure, it was clearly possible to significantly reduce the unit cost and therefore purchase more units if there was more money to bring to the table. Like in many program offices operating under fiscal constraints, finding more money was not an option. Therefore, the program office set out to find additional partners to join the cause.

The Army already had an approved combat requirement for a new ECM capability. After conducting multiple evaluations and a face-to-face capability briefing between the Army’s Electronic Attack office and PMCP, the Army committed its programmed funds toward the next production lot of the Modi system. The U.S. Marines Corps (USMC) also expressed an interest because they were invested heavily in a Modi variant called the “Modi II.” The USMC was able to commit additional funds to achieve optimal economic order quantities for the procurement of band module kits. The band module kits comprise the bulk of the Modi system and cost, and are identical to those used on the USSOCOM configuration (see Figure 1).

With the collaborative success and the majority of the funding in-hand by July 2018, a September 2018 award was set and successfully executed. The Lot 4 procurement contract included a 90-day option to purchase more systems, thereby deliberately inserting even more flexibility into the overall strategy by creating an opportunity to leverage both programmed and potential fall-out funding across 2 fiscal years. Ultimately, the collaborative procurement plan corralled \$156 million and fused system requirements from three major government organizations: USSOCOM, USMC, and the Army. Alone, each would have had only enough funding to procure 464 systems. Together, using collaborative buying power, the team was able to procure a total of 1,089 interoperable Modi systems and band module kits, saving more than \$32,000 per system.

Improve Manufacturing

Simultaneously, PMCP met with the prime vendor to investigate the source of the drastic cost growth and determine if there were any other options to streamline costs. A series of programmatic reviews revealed to both PMCP and the prime vendor that a primary driver in the price increase was a major sub-contractor’s dramatically increased operating costs due to escalating labor rates, burdens and fees—costs that were passed through to the prime vendor, and, ultimately, to the government. After numerous negotiations, the prime vendor proposed bringing in-house the Modi system’s assembly and fabrication. This shift took advantage of the prime vendor’s organic engineering and manufacturing facility while reducing the cost per system by 30 percent. As part of award negotiations, the prime vendor offered to make additional capital investments

in the equipment to conduct environmental stress screening to improve production reliability and throughput.

Collectively, these positive changes enabled the procurement team to reclaim affordability and increase the operational availability of the Modi system, all while maintaining a delivery schedule commensurate with mission requirements. This commitment to pursue efficient and effective acquisition principles, merge efforts with other Services, and work with the vendor to improve manufacturing processes, is a prime example of the importance of buying smart. These efforts resulted in a total cost saving of \$35.4 million, enabling the procurement of more than twice as many systems and thereby meeting the operational requirements of warfighters in USSOCOM, the U.S. Army and the USMC.

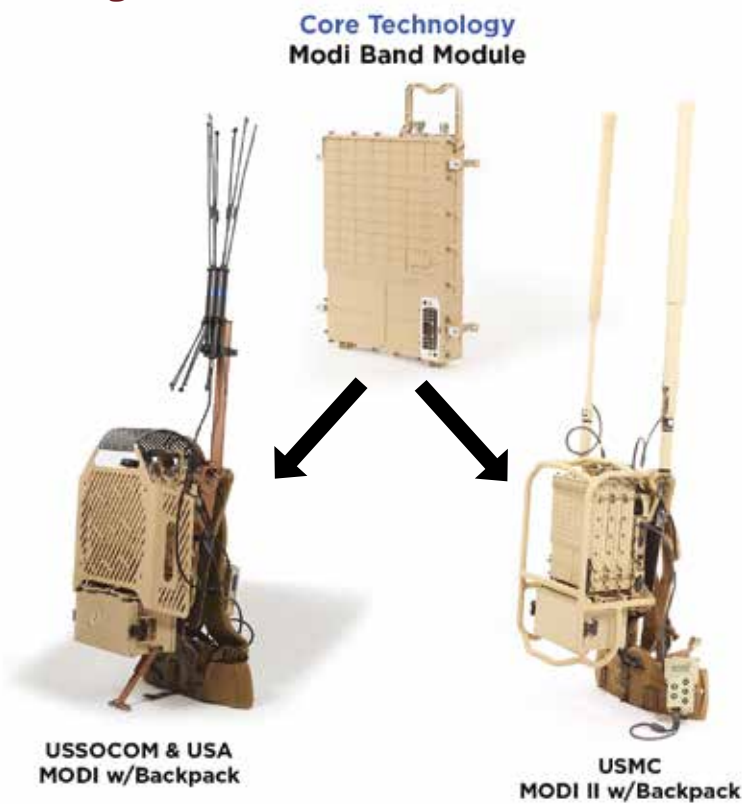
Forging Commonality and Interoperability

With that acquisition success accomplished, PMCP next conducted a thorough technical analysis of the current dismounted ECM family of systems across the three organizations to identify technical redundancies and discrepancies. Over the years, the SOF and Service-level technical requirements had diverged. By 2018, there was only 70 percent commonality of hardware and software in the currently fielded systems. This drove higher prices for technology refreshes, upgrades and maintenance. It also created significant sustainability issues in the field with noninterchangeable spare parts, software and separate maintenance technical orders. To simplify both procurement and sustainment, the Modi community needed to identify a single dismounted configuration that could be easily upgraded, swapped, transported, and maintained, regardless of who owned or operated it.

To accomplish this, PMCP arranged a working group with key stakeholders across the entire Department of Defense enterprise. This included USSOCOM, the U.S. Army, USMC, and other government organizations that use the Modi system. This comprehensive user group scrutinized the Modi hardware configurations, software baselines and the Tactics, Techniques and Procedures (TTPs) of each organization. The working group identified the “best-of-breed” solutions and fused technical requirements and operational TTPs into a single Modi baseline.

The group began by establishing a common software baseline. Software upgrades, development and testing costs could now be cost-shared among stakeholders. Furthermore, software commonality meant that the Modi enterprise could adapt, learn and benefit from the experience

Figure 1. Current Dismounted Modi Configuration



Source of figures: Sierra Nevada Corp. for USSOCOM and USMC.

of any single organization or Service. For instance, one Service could develop and share a new jamming technique against emergent threat across all Modi systems with no additional development or integration costs. The program office expects that the ability to use the same software across all Modi systems will continue yielding dividends well into the future, saving millions across the life cycle of the system.

Similarly, fusion of the Modi system hardware baselines to 95 percent commonality across the SOF and Service variants further increased the system’s interoperability and paved the foundation for simpler acquisition in the future. This will enable stakeholders to share the cost of replacing obsolescent parts and components, thus streamlining the overall production process and boosting each Service’s individual return on investment. Merging the hardware baseline increases overall interoperability and eases sustainment in the field, resulting in significant cost-avoidance for the remainder of the Modi life cycle.

Create Competition

The above initiatives collectively created wins for both the government and the prime vendor. Manufacturing

improvements and economies of scale resulted in better affordability, while commonality and increases in order quantities improved availability. Throughout the analysis of the Modi technical baseline, the stakeholders emphasized the need to develop an open architecture approach to incentivize innovation in industry and promote competition among other vendors for both subcomponent development and future system procurement. PMCP worked with the Defense Threat Reduction Agency (DTRA), with the Modi vendor in support, to develop a government-owned design for a Software Defined Radio (SDR) module that can attach to the Modi system. DTRA developed 18 prototype modules and conducted environmental qualification, bringing the design to Technical Readiness Level (TRL) 8. As a proof of concept, DTRA has hosted and tested two major government-owned ECM software applications on this module and produced a complete technical data package ready for third party production.

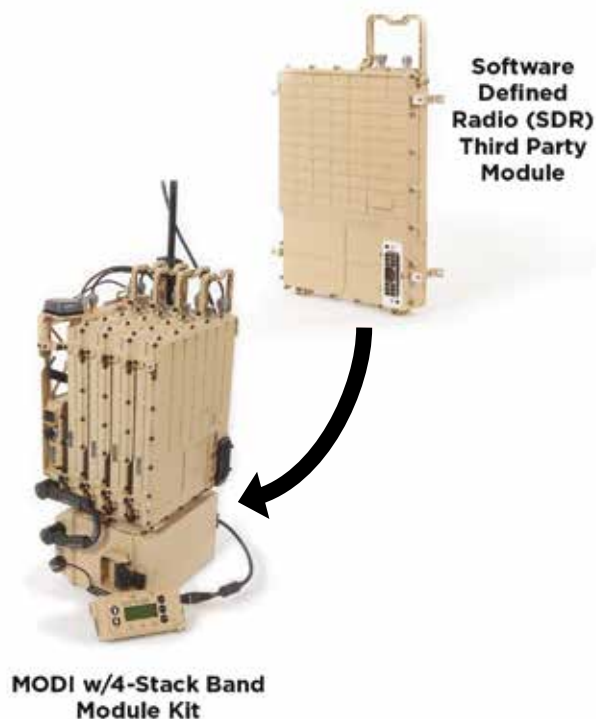
Open architecture represents a win-win-win situation for the other industry partners, the prime vendor and the government. For other industry partners, open architecture creates new competition among commercial technologies striving for government procurement and incorporation. For the prime vendor, open architecture represents a chance to explore complementing products, as the government's base platform capabilities increase the overall demand and market opportunity for a host of other supplemental capabilities and increased applications. Very much akin to what successful cell phone companies found when they allowed complementing products (i.e., third-party developed applications) to run on their platforms, SDRs offer a near-limitless opportunity for additional after-market products (See Figure 2).

Finally, for the government, open architecture increases the opportunity to gain additional capability for fielded hardware, facilitating the ability to rapidly incorporate emerging technologies and evolve with the enemy. In addition, the program office plans to use some of the new acquisition tools to procure this capability, including Section 804 (Middle Tier Acquisition) authority and Other Transaction Agreements to keep pace. By leveraging this government-owned/third-party vendor module, Modi stakeholders, present and future, will avoid millions of dollars in expenditures on research and development of disparate hardware platforms and be positioned to take advantage of new, cutting-edge technology.

Operational Impact

The USSOCOM 2018 award of \$156 million to Sierra Nevada Corporation for Modi resulted in the largest procurement of dismounted ECM systems in the program's history. Through aggressive application of buying smarter and acquisition reform principles, the procurement team

Figure 2. Stacking Added Capabilities to Modi



identified myriad cost efficiencies, driving a 54 percent cost reduction per unit and \$35.4 million total cost savings across the Modi enterprise, all while fielding more than twice the number of systems to SOF and Service operators. Fusing the hardware and software baselines resulted in commonality across all organizations and increased interoperability. From an acquisitions perspective, the team was able to procure 625 more Modi systems than originally thought possible and, as a result, will field the current operational requirement 4 years ahead of schedule. From an operational perspective, these systems will deliver to multiple forward operating bases, airstrips, communication nodes, SOF teams, convoys and remote outposts where they will save lives.

Acquisition professionals should always remember what's at stake, take advantage of the latest reform initiatives or rapid acquisition tools when it makes sense, and never allow their work to become just numbers on a spreadsheet. End users rely on acquisition professionals to deliver what they need, when they need it, and that it will perform as expected. It is up to the ingenuity, skill and resourcefulness of the Acquisition Corps to stay focused on the final objective and Buy Smarter.

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Platinum for *Defense Acquisition Magazine*

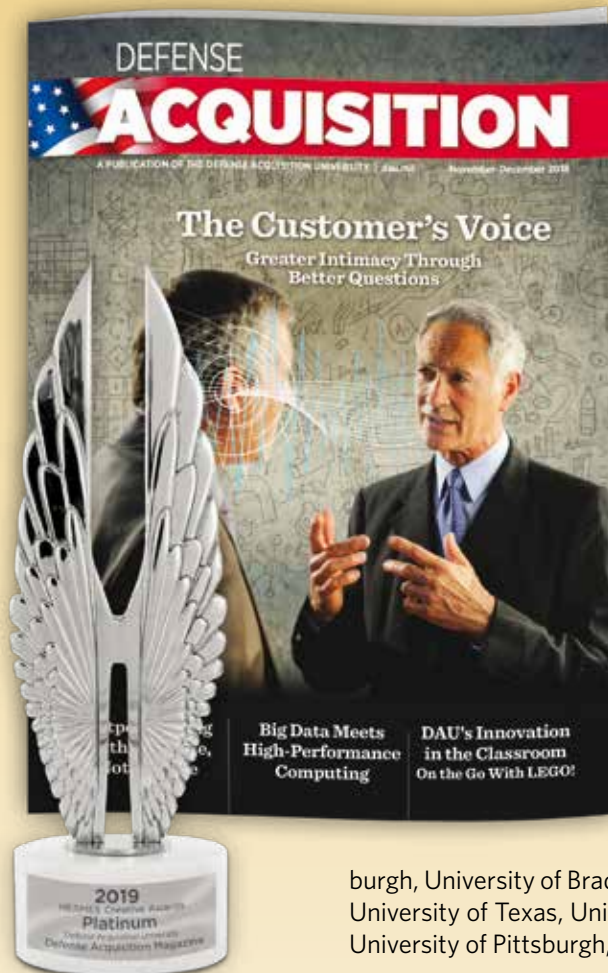
Defense Acquisition magazine has won a platinum Hermes Award for 2019—a move up from last year’s gold award. The award was for the November-December 2018 issue.

According to the announcement, publications must receive scores above 90 to win platinum, and 80-89 for gold. *Defense Acquisition*’s sister publication, the *Defense Acquisition Research Journal* (ARJ), also received platinum.

Hermes Creative Awards are granted by the Association of Marketing and Communication Professionals (AMCP) in Dallas, Texas. According to AMCP, “Hermes Creative Awards is an international competition for creative professionals involved in the concept, writing and design of traditional and emerging media. The awards recognize outstanding work in the industry while promoting the philanthropic work of marketing and communication professionals.” Hermes was the name of the ancient Greek god of trade, sports, travelers and athletes—and is associated with the Roman god Mercury.

AMCP includes of several thousand marketing, communication, advertising, public relations, digital media production and freelance professionals. AMCP oversees awards and recognition programs, provides judges and issues awards for outstanding achievement and service to the profession.

AMCP states that, “Judges are industry professionals who look for companies and individuals whose talent exceeds a high standard of excellence and whose work serves as a benchmark for the industry. There are ... about 6,000 entries from throughout the United States and many other countries in the Hermes Creative Awards 2019 competition.” About 15 percent of past entries have received platinum awards. “The name Hermes and the idea for the award were chosen to represent our roles as the messengers and creators of marketing and communication materials and programs.” A statuette is awarded, in this case in a platinum



finish, modeled on the wings of Hermes (think winged Mercury, symbolizing swiftness).

Participating organizations besides Defense Acquisition University (DAU) Visual Arts and Press included, among many others, the American Association of Retired Persons, Alabama Power, Purdue University, AIG (American International Group), American Museum of Natural History, Chesapeake Bay Foundation, Deloitte, Hill & Knowlton international public relations, IBM, Institute of Electrical and Electronics Engineers (IEEE), National Geographic Learning, NFL Players Association, State Farm Insurance, The Washington Post, Thomson Reuters, and Tiffany & Company. Also Virginia Commonwealth University College of Engineering, Wake Forest University, University of Pitts-

burgh, University of Bradford (England), Sam Houston State University of Texas, University of Massachusetts at Lowell, University of Pittsburgh, Warner Brothers.

This is great recognition, for the staff of *Defense Acquisition*. It also is great recognition for DAU and by our professors, learning directors, Service members and Workforce members and partners who are our subject-matter experts and authors of the articles we publish. Let’s keep up the good work.

Defense Acquisition staff specifically mentioned in the award include managing editor Benjamin Tyree and art director Tia Gray, who devote most of their working hours to the magazine. Named as well are the production, editorial and graphics teams of DAU’s Visual Arts and Press department, which operates under the guidance of Robert Weekes. Staff contributors include Debbie Gonzalez and Michael Shoemaker (copy editing and proofreading); Frances Battle (production and press coordination); Nina Austin (online design and placement); Collie Johnson (online only content aggregator and editor); Noelia Gamboa (administrative and editorial support); with additional final review contributions by our ARJ colleagues.

Congratulations and high fives all around!

—Benjamin Tyree, managing editor

Awarding the **Best Value** Solution

Steven E. Moore, Ph.D.

FIRST IN A SERIES



IT HAS BEEN 3 YEARS SINCE THE OFFICE OF THE SECRETARY of Defense (OSD) initiated Value Adjusted Total Evaluated Price (VATEP), so this seems a good time to evaluate whether VATEP has satisfied the stated goal of supporting a “Best Value” decision by delivering higher-performing systems. It also is appropriate to capture and share lessons learned from the acquisition professionals and their solicitations where they have used VATEP.

VATEP was created to add objectivity to the inherently subjective practice of asking the Source Selection Authority (SSA) to make a trade-off decision. The Department of Defense (DoD) created VATEP with two objectives stated in the April 1, 2016, DoD Source Selection Procedures memo:

- To help Industry better understand what parameters of performance were valued by the government
- To determine how much system performance above the minimum acceptable performance, as defined by (a) technical parameter(s), would be worth to the government

Because DoD created VATEP to improve source-selection outcomes, it is appropriate to do some analysis and evaluation to determine whether we have met our objectives. If VATEP improves our trade-off source-selection process, more of our acquisitions should use it. However, if VATEP falls short of our expectations, we must determine whether there is a way that it can be improved to meet those expectations or if its use should be discontinued.

Sometimes the least expensive, threshold (minimum acceptable) performance is indeed the best value to the DoD. However, when the SSA intends to choose a best value source, VATEP was designed to help SSA resist the various forces driving the SSA to choose the minimum performing alternative from the lowest cost offeror. Let us examine its effectiveness with the following four goals in mind:

- Provide insight into the legacy of the VATEP concept, along with an overview of the defined VATEP procedures.
- Explore the use of VATEP in recent, completed source-selection processes to see how VATEP procedures were mechanized to add objectivity to trade-off solicitations.
- Explore perspectives from those who have implemented or been involved in VATEP source selections to glean lessons learned that could identify possible enhancements.
- Recommend possible enhancements to VATEP process to implement lessons learned in order to deliver warfighter systems with desired capability above threshold system performance when doing so is affordable.

Background

Former Under Secretary of Defense for Acquisition, Technology and Logistics (USD[AT&L]) Frank Kendall created the impetus and the method

Moore is assigned to Defense Acquisition University as professor of Program Management for almost 2 years. Prior to DAU, he was a leader in Orbital ATK's Defense Group for 27 years and served 10 years as an active duty Air Force Acquisition Officer. He has a Ph.D. from Capella University, a bachelor's degree from the U.S. Air Force Academy and an M.S. degree from the Air Force Institute of Technology. He is a certified Project Management Professional.

to create VATEP in his article in the March-April 2015 issue of *Defense AT&L* (the previous name of *Defense Acquisition* magazine). That article, titled “Getting “Best Value” for the Warfighter and the Taxpayer,” described the scenario for which VATEP was created—to “spur innovation” by “communicating the ‘value function’ to the offerors so they can bid more intelligently.” Kendall recalled an actual scenario in which there were three primary metrics defining the source selection process—cost, risk and performance. The choice presented to the SSA was between

... a slightly more expensive and higher-risk but much higher-performing offeror and a slightly less expensive and lower-risk but significantly lower-performing offeror. The Source Selection Authority would have to decide whether the increased price and risk of the higher offeror was worth the difference in performance. That acquisition official, not our customer (the warfighter), would have needed to make the “best value” determination as a subjective judgment by weighing cost against the other two metrics. In effect, that individual in the acquisition chain would make the precise cost versus performance and risk judgment we intend when we recommend monetizing the value of performance and including it in the evaluated price.

The likely bias for an acquisition official making the source selection is to take the lowest-price offeror; it’s much easier to defend than the subjective judgment that the higher-cost offeror was worth the difference in price. Is this the best way for us to do “best value” source selections? To the extent we can do so, we are better off defining “best value” by a single parameter we can readily compare. The easiest way to express that parameter is in dollars—using value-based adjusted price for evaluation purposes (e.g., bid price with predefined dollarized reductions for performance above threshold).

Clearly, Kendall had VATEP in mind as he wrote these words, and about a year later, Kendall’s Director of Defense Procurement and Acquisition Policy institutionalized VATEP. According to the April 1, 2016, USD(AT&L) DoD Source Selection Procedures memo, Appendix B:

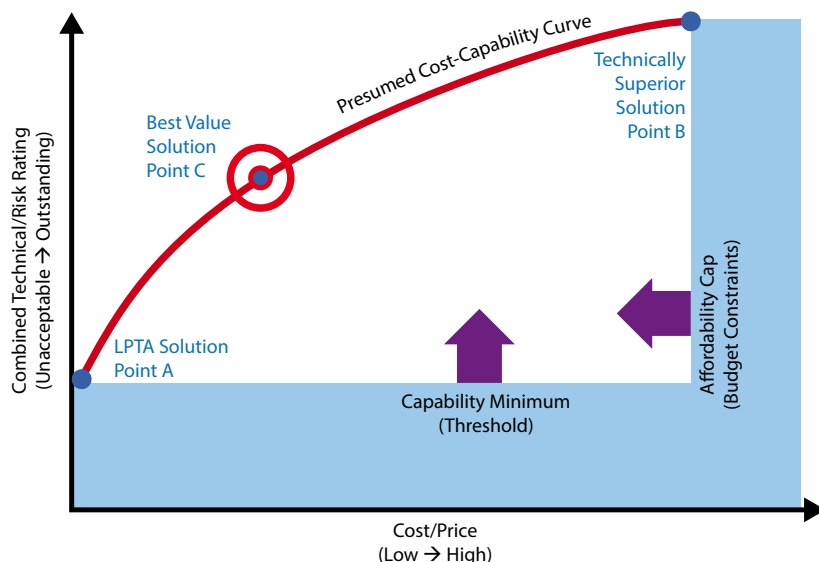
The methodologies described in this appendix [Appendix B] are the Subjective Tradeoff and Value Adjusted Total Evaluated Price (VATEP) Trade-off techniques. These tradeoff processes are distinguished from Low Price Technically Acceptable [LPTA] source selections by permitting the SSA to consider award to other than the lowest evaluated price offeror or other than the highest technically rated offer. Tradeoffs are improved by identifying in ad-

vance and stating in the solicitation the Government “value” placed on above threshold performance or capabilities.

To fully grasp the objectives of VATEP, we must first understand a concept called the “Best Value Continuum.” That is the trade space between the LPTA solution and the more costly Technically Superior solution. The LPTA solution is where the lowest price offeror meets all the minimum requirements of the procurement (Figure 1, Point A). The Technically Superior solution offers the most capable system that still meets DoD’s financial limitations (Figure 1, Point B). Assuming that there are multiple criteria or “features” that define the desired system’s capabilities, this continuum typically is defined by a cost-capability curve (Figure 1, Red Curve) defining the cost-capability trade-off between Points A and B. This curve, defining the Best Value Continuum, typically includes an inflection point or “knee” in the curve where lower cost capabilities can be satisfied before higher cost capabilities are added to yield the overall Technically Superior solution. The design projecting performance at this inflection point (Figure 1, Point C) is defined as the “Best Value” solution.

Prior to the introduction of VATEP, the best-value trade-off process required the SSA to make a “subjective trade-off” of system performance versus cost, with support from the Source Selection Advisory Committee. Kendall conceived VATEP both to help guide industry to provide better, more cost-effective solutions that provide value to the government above the minimum requirements, as well as add some objectivity to the source-selection process in finding that point of maximum capability versus minimum cost typically found at the knee of the curve. Remember that,

Figure 1. The Best Value Continuum



Source: Figures derived by the author from *DoD Source Selection Memo*, Appendix B.

despite the intended introduction of objectivity into the source-selection process with the VATEP process, the SSA retains the responsibility and opportunity to balance the objective and subjective criteria of the procurement in a fair and equitable methodology in accordance with the evaluation factors outlined in the solicitation.

A critical element of the VATEP process is determining the “value” of performance above threshold. According to the DoD Source Selection Procedures memo, Appendix B:

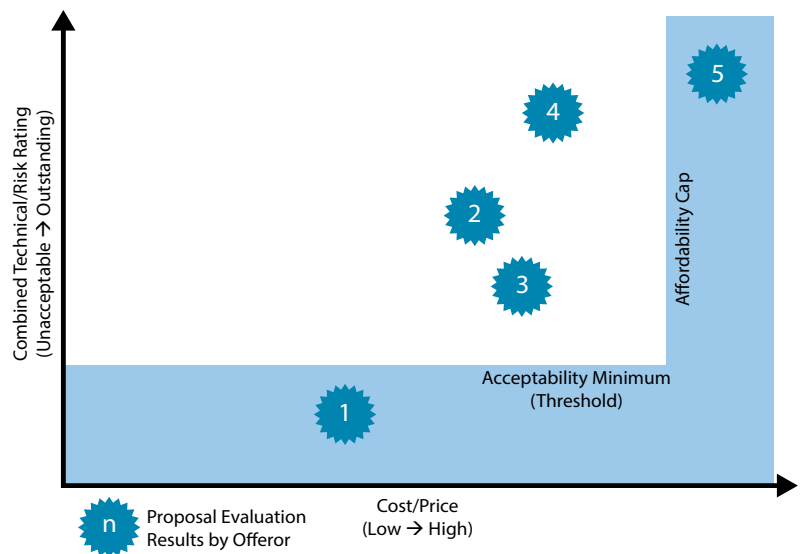
Defining the value of higher performance is the RO’s [Requirements Owner’s] responsibility. During this part of the process, it is very important for the RO to define, and the SST [Source Selection Team] to understand, which above threshold (minimum) capability requirements are truly of substantial benefit and how they are valued relative to each other and in absolute terms. Clearly understanding the relative importance and prioritization of requirements will determine if above-threshold performance/capability for a particular requirement warrants a potentially higher price during proposal evaluation. This decision should consider a number of matters, to include operational benefits, risk, and affordability.

In fact, the valuation of the critical parameters is the most important and in many cases where VATEP was implemented, proved to be the most difficult value judgment throughout preparation of the request for proposal (RFP).

VATEP Description and Example

The VATEP procedure is defined by the DoD Source Selection Procedures, Appendix B. An abbreviated description of VATEP from Appendix B is provided to illustrate how it is designed to work. For this fictional source selection, presume that the procurement employed VATEP criteria, which were established and communicated to Industry as part of the RFP. Five offerors submitted proposals. The Source Selection Evaluation Board (SSEB) examined those five offerors’ proposals to yield the results shown in Figure 2. In this case, the SSEB recommended elimination of two offerors’ proposals from the competition. Offeror Number 1 did not meet a defined technical threshold (or thresholds) and was therefore eliminated by the SSA. Offeror Number 5 provided the technically superior proposal, but did not comply with the Affordability Cap for the procurement, and therefore also was eliminated by the SSA. Based on the proposed solutions from the remaining three offerors (Numbers 2, 3 and 4), each proposal was evaluated as shown in Figure 2. This is the normal result of a broadly familiar source-selection evaluation, where the SSA is

Figure 2. Fictional Source-Selection Results

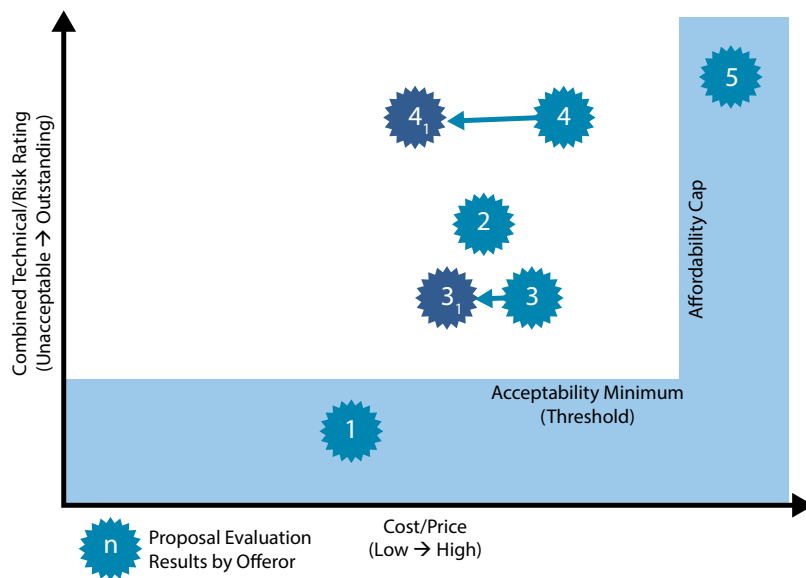


called upon to subjectively decide whether the additional capability between Offerors 2 and 4 would be worth the additional cost between Offeror 2’s total proposed price (TPP) compared to offeror 4’s TPP. The application of the VATEP process seeks to provide the SSA with objective support for choosing additional warfighter capability at a higher cost by decrementing that offeror’s evaluated price.

The Requirements Owner (RO), on behalf of the user-warfighter and in cooperation with the procurement contracting officer, program manager, and SST, determines the VATEP decrement (in dollars or percentage of TPP) earned by each increment of performance between threshold and objective for each performance parameter. In some use cases, only one parameter has been identified for VATEP decrement. In other cases, multiple parameters have been chosen for VATEP adjustments. The RO can define the decrements based upon an equation, discrete increments, or all-or nothing (e.g. no decrement below a stated level of performance). The value and structure of the decrements are communicated clearly to Industry in the RFP. Some examples of the actual VATEP implementations will be the primary topic of the next article in this series.

The Appendix B continues the discussion regarding the remaining three offerors within this scenario where each of the three remaining offerors are granted the VATEP decrement that they earned as defined within the solicitation. Figure 3 shows the reduction in evaluated price earned by offerors Number 3 and 4. These two new values (3_1 and 4_1) are referred to as the total evaluated price (TEP) for each supplier. Because of lower system performance that did not reach stated VATEP performance levels, the SSEB judged that Offeror Number 2 did not earn any VATEP

Figure 3. Source-Selection Results with VATEP Decrement



decrement. Notice that the VATEP decrement provides a new “evaluated price.” Therefore, the VATEP decrement provides a lower TEP to help the SSA justify the selection

of the higher level of system performance from Offeror Number 4. This is precisely the scenario that VATEP seeks to enable. In this case, the SSA could objectively justify the selection of the more capable system, even at a higher TPP. (Note that the TEP is not the price upon which the contract is awarded, but rather the TPP is awarded to help the contractor pay for the additional cost of the additional system performance. However, the offerors are notified in the solicitation that the requirements documented in the contract to the winning contractor will be modified to adopt the higher level of performance proposed based upon the VATEP decrement[s] awarded.)

Upon further reflection, some might ask, “What happens in this scenario if Offeror Number 4 did not exist? Wouldn’t the SSA then be compelled to choose Offeror Number 3?” It is unlikely that any SSA would

choose the offeror with higher TPP and lower performance (Number 3) over the offeror with lower TPP and higher performance (Number 2). Another typical question may be, “Shouldn’t we calculate the decrement from Offeror Number 5’s position since it may provide a lower TEP due to the higher delivered system performance?” However, Offeror Number 5’s TPP exceeds the Affordability Cap (and presumably the program budget) and we must remember that the contract value is awarded at the TPP, not the TEP.

In conclusion, VATEP was established to provide objective criteria by which SSAs could choose a higher-performing offeror’s proposal when that proposal delivers performance in excess of government thresholds despite that proposal’s higher cost. Additionally, VATEP was designed to provide guidance to Industry to understand not only what performance was valued by the government, but also the degree to which that performance was valued in a common parameter understood by both government and industry—dollars. However, VATEP was never intended as a replacement for the more generic “Best Value Trade-off” process, but rather an optional, objective supplement to the best-value process. When properly designed, VATEP can provide objective support to the SSA’s desires to deliver the best technology that the DoD can afford to our warriors.

In the next article, we will explore the use of VATEP in recent, completed source-selection processes to understand how various organizations have implemented the VATEP process.

The author can be contacted at steven.moore@dau.mil.

MDAP/MAIS Program Manager Changes

With the assistance of the Office of the Secretary of Defense, *Defense Acquisition* magazine publishes the names of incoming and outgoing program managers for major defense acquisition programs (MDAPs) and major automated information system (MAIS) programs. This announcement lists recent such changes of leadership for both civilian and military program.

Army

Col. Robert M. Williams relieved **Col. James McNulty** as program manager for the Integrated Personnel and Pay System on April 15.

Navy/Marine Corps

CAPT Jason S. Hall relieved **CAPT Elizabeth “Seiko” Okano** as program manager for the Air and Missile Defense/Surface Electronic Warfare Improvement Program (IWS 2.0) on March 11.

CAPT Seth A. Miller relieved **RDML Casey J. Moton** as program manager for the DDG 51 Arleigh Burke Class Guided Missile Destroyer (PMS 400D) on April 15.

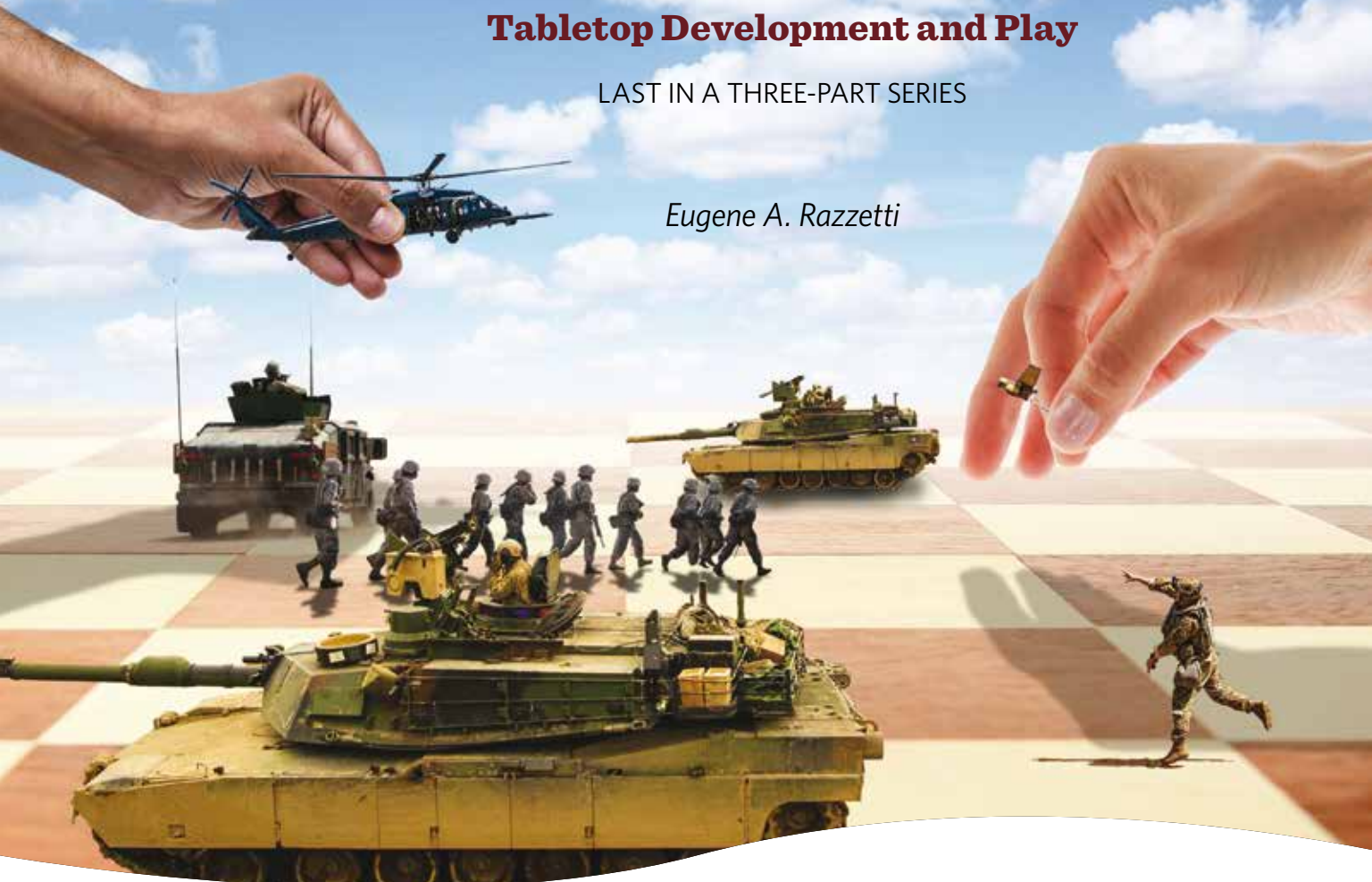
CAPT Godfrey D. Weekes relieved **CAPT Theodore A. Zobel** as program manager for the Littoral Combat Ship Mission Modules Program (PMS 420) on April 26.

Simulations VERSUS Case Studies

Tabletop Development and Play

LAST IN A THREE-PART SERIES

Eugene A. Razzetti



A TABLETOP EXERCISE IS A DISCUSSION-BASED EVENT IN WHICH PARTICIPANTS MEET IN A “CLASSROOM” setting to address the actions that they would take in response to an offensive, defensive or otherwise emergency situation—a preliminary “proving ground” for a product prior to its completion. Tabletops can be an effective initial step to deliberate the program goals and objectives as well as the full range of issues related to the product(s) to be developed—in operational or even crisis scenarios. These exercises provide a relevant, credible and consequential forum to examine roles and responsibilities, unearth interdependencies, develop needs and risk assessments, and evaluate contingency plans.

In the last two issues of this magazine, I discussed the value of simulation in decision making and recommended that Tabletop and/or Wargame exercises replace traditional case studies in both classrooms and in actual decision making. That is, replace the static case study goal of examining “What happened?” with the dynamic tabletop goal of determining “What if?”

Razzetti, a retired U.S. Navy captain, is a management consultant, auditor, military analyst and frequent contributor to Defense Acquisition magazine and the former Defense AT&L magazine. He is the author of five management books, including *Fixes That Last—The Executive's Guide to Fix It or Lose It Management*, and has served on the advisory boards of two business schools.

Figure 1 (from Part I) summarizes the general requirements for simulation in a tabletop or wargame exercise. Part II expanded each of the four areas in Figure 1, to suggest that proven management practices and approaches lead to “excellent” decisions.

Part III will go into more detail on TACSIT development—the principle part of the tabletop. Through the employment of Tactical Situations or TACSITs in the tabletop exercise, we’ll move on to “What’s next?” and (hopefully) “What a good idea!” Part III, like its predecessors, is based on my previous experience as a military analyst and developing the tabletop exercise concept for reserve units mobilized to deploy to the Middle East. Part III will add still more detail to the work of the simulation development processes, helping planners and program managers to create effective and realistic tabletop or wargame exercises in real time, and leading to actionable conclusions, recommendations, and executions.

This is also where to employ what the late, great management guru Dr. W. Edwards Deming called “Profound Knowledge.” Deming’s theory of profound knowledge is a management philosophy grounded in systems theory and based on the principle that an organization is a system of interrelated processes and people. The success of all participants within a program or project depends on the ability of the Department of Defense (DoD) to orchestrate the delicate balance of each component to optimize the entire system.

Tabletop Development

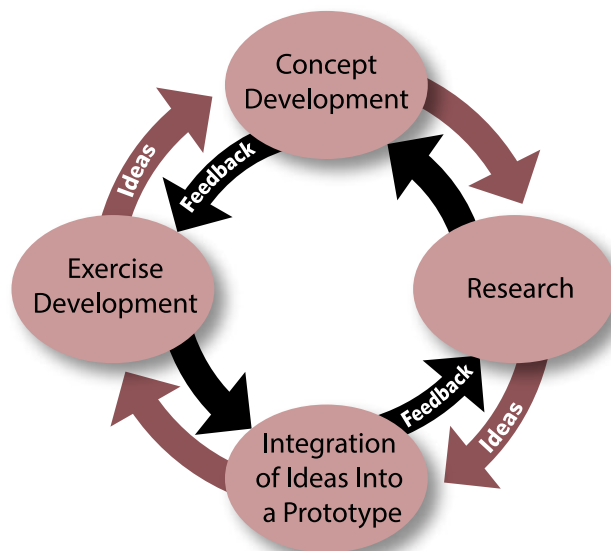
The specific program objectives become the tabletop’s specific objectives.

Tabletop development is where planners do what they are supposed to do: plan. All areas of operational and programmatic expertise meld the TACSIT into a functioning, dynamic, living structure, with a goal of creating a comprehensive exercise that uses the best information to arrive at (all) the best possible conclusions, recommendations, strategies, tactics and concepts of operations (CONOPS).

The Tabletop Planning Team should include experienced tabletop and/or wargame facilitators, who can orchestrate and streamline the processes. Referring to Figure 1: “Concept Development,” “Research” and “Integration of Ideas Into a Prototype” are the same as those developed for the product and should cover the same goals and objectives. Accordingly, “Exercise Development” should both follow and reflect the same developmental process as the product. You can’t do this with a case study.

The exercise (again, either tabletop or wargame) now includes battlespace management, or who does what—and

Figure 1. Developing a Tabletop or Wargame Exercise



Source: Tables and figures by the author.

where. Standard operating procedures (SOPs), CONOPS and checklists, reduce the battlespace management to workable and replicable practices and procedures, chains of command and communications networks. Logistics planners structure the supply chain for normal and surge operations in accordance with the threat scenarios, timelines, weather and the environment.

This also is where planners and program managers take a critical look at technological “yield.” That is: Do the resources—however complex—optimally and successfully accomplish the missions. Or is a greater mastery required? The specific objectives of the program become the specific objectives of the tabletop.

Figure 2 (from Part II, see *Defense Acquisition*, May-June 2019) includes some of the abbreviations with footnotes to avoid any confusion. Most of the terms, are in common use in the military. The red box to the left covers the best management practices that are essential to program management in general, and, particularly, to forming the exercise and the decisions that come from it.

TACSIT simulations (in tabletops and wargames) are supported by pointed, actionable approaches that modern management books collectively call the practice of excellence, and excellence must become the way the system does everything.

We discuss the benefits of modeling and simulation in tabletop exercises for DoD in general terms only. Actual TACSIT scenarios vary with each program or project. The

private sector already uses tabletop exercises in areas such as Business Continuity Management. Many consulting firms offer TACSIT development, facilitation services and gaming software. They can be found on the Internet. The TACSIT scenario, developed and/or chosen for its greatest applicability, forms the basis of the tabletop.

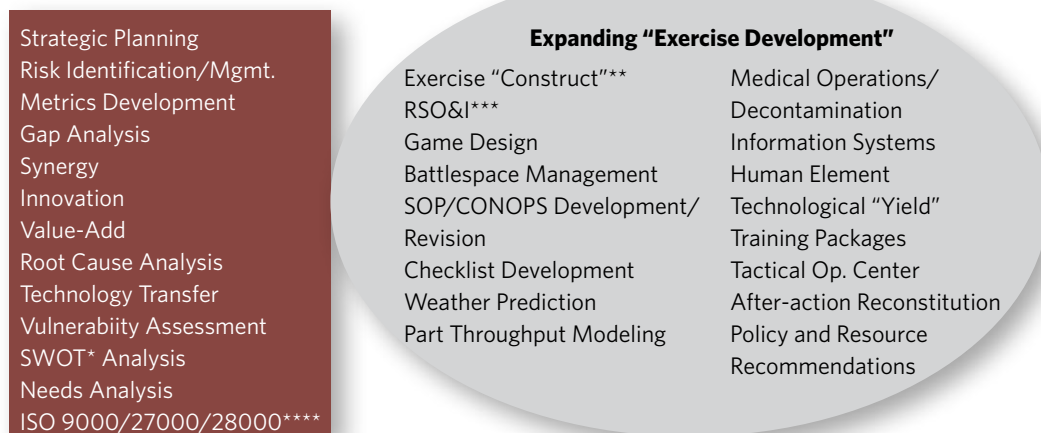
Tabletop Play—an Exercise, Not a Homework Assignment

Tabletop participants, normally seated around a long conference table, deal with a scenario affecting the command and its mission. An experienced facilitator will guide discussion by asking questions designed to address the exercise's objectives and to keep participants focused. He

or she may choose to inject modifications into the scenario to further stimulate discussion. Participants also will be encouraged to question their own beliefs and understandings, as well as those of the other participants.

Figure 3 describes the actual creation and execution of the tabletop. The subject matter in the box marked "Input/Preparations" reflects

Figure 2. Expanding "Exercise Development"



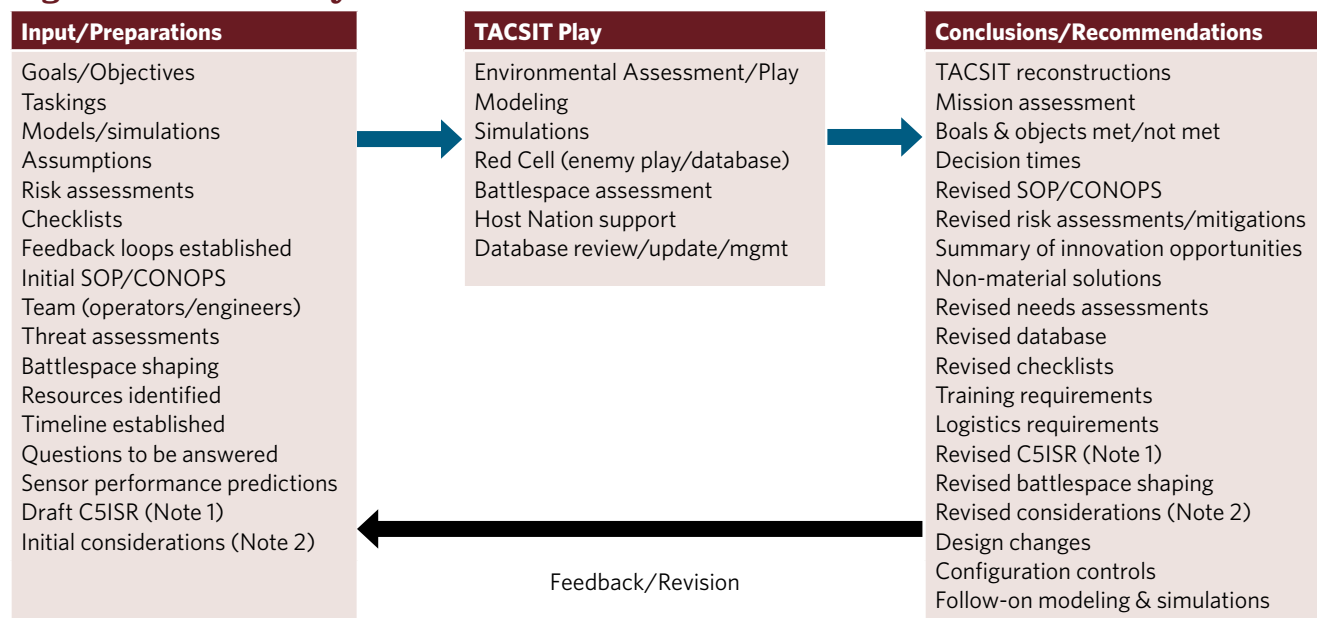
* SWOT: Strengths, Weaknesses, and Opportunities and Threats

** Pronounced KONN-struct; used as a noun

*** Reception, Staging, Onward Movement and Integration

**** Quality, Information Security, and Supply Chain Security international management standards

Figure 3. TACSIT Play



Note 1: Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, Reconnaissance

Note 2: (Notional) Mission preparation time, payload, crew size/loading, speed, distance, time on station, loads, survivability, vulnerability, situational awareness, connectivity, supportability, lethality

the work of Figure 1, and is needed to make the TACSIT realistic and actionable.

You won't get this material with a case study.

Team members assigned to various positions (e.g., friendly forces, host country, Command Center, enemy) "game" the TACSIT by iteratively introducing changes and simulations into the scenario, such as (to name a few):

- Monsoons, sand storms, temperature extremes
- Dock worker strikes and work stoppages
- Intrusions, attacks (including chemical/biological), sabotage, improved explosive devices

way toward guaranteeing program or project success. You won't get this material with a case study, either.

It could be argued that the same end products (a CONOPS, for example) could be developed from a case study. However, the data robustness and credibility, plus the ownership that comes from modeling and simulating different conditions, and the interplay and modeling of outcomes could not be replicated using even the most comprehensive (but static) case study.

Tabletop Facilitator and Participants

The primary role of a facilitator is to ensure that the tabletop exercise proceeds on schedule and achieves

...the data robustness and credibility, plus the ownership that comes from modeling and simulating different conditions, and the interplay and modeling of outcomes could not be replicated using even the most comprehensive (but static) case study.

Modeling of a simulated chemical/biological attack (for example) should include:

- Situational awareness, risk and probability of attack
- Agent detection and identification
- Defensive and avoidance measures and safe stay times
- Avoiding and/or rerouting around the contaminated areas and the probability of additional contamination
- Determining alternate routes or storage areas
- Personnel and material decontamination and definition of acceptable levels
- Utility losses and back up capabilities (e.g., portable generators)
- Resupply of expended decontamination material (including Continental U.S. reachback as required)

Make sure the TACSIT is comprehensive and ready to be modeled. First draft TACSITs can be either too general or too narrow; not dealing with specific details; and thus not ready for play and incapable of creating credible intelligence for decision making.

Please take a good look at the "Conclusions/Recommendations" box in Figure 3. These are the potential harvests of dynamic and thoughtful TACSIT play. Developing and/or revising all of these (or as many as possible) virtually guarantees the success of the simulation and goes a long

the desired outcome of determining the soundness of the program and the viability of the final documentation. To achieve those results, there are numerous (and often spontaneous) questions that can be asked as the exercise begins and then throughout TACSIT play, and finally to the assignment of responsibility for corrective actions.

A facilitator also has the option to introduce "roadblocks" to the players, to further identify gaps or weaknesses in the documented strategies and plans, as well as the hardware, and to add additional failure conditions during the tabletop exercise. It's better and safer to have these issues injected in the conference room than on the job, or in the field when it often is too late.

Tabletop participants should include operational commanders, program managers, technicians, operators, intelligence specialists or others critical to the mission of the forces from all the key commands and organizations—the most qualified that you can find. Public affairs specialists keep up with changing situations and draft media releases. Participation also should include the contractors, DoD specialists in finance, human resources and public relations, as well as vendors and other supply-chain partners. Each must understand his or her own responsibilities and those of the others. All organizations

must send at least one qualified member, empowered to act for his or her parent organization during the exercise and to commit that organization to the action steps that follow the tabletop's findings.

Findings and Conclusions

Participants should complete initial after-action reports (discussions, debriefs or "hot washups") as soon as possible after the tabletop, in order to maximize its benefit. Data, albeit raw in some instances, are presented at that time. Participants compare findings with program goals; and action plans are initiated for all the tabletop findings identified.

Tabletop exercise findings can include, for example:

- Product designs require modification.
- Documentation requires revision or additional detail (i.e., CONOPS out-of-date).
- The Commander's "Dashboard" of situational awareness, critical data and required reporting lack sufficient input.
- The product's advertised Top Level Requirements (TLR) are insufficient or excessive for the missions of the product, as developed in the concept design stages (Example: a landing craft may not require an especially shallow depth).
- The sequence of tasks and strategies needs review or change; timelines are not realistic.

- Additional assignment of responsibilities is needed, for example, to ensure continuity of command for all key missions.
- Training programs and logistics pipelines are unrealistic, and/or lack sufficient range and depth.

Reports provide not only the list of action items but also the justification for each. Supporting and feeder reports (where required) should assess more in-depth data analyses, gaps discovered, and the corrective actions needed to correct those gaps. This last part is critical. Early on "buy-in" from the highest levels and continuing support is essential to success of the tabletop.

The Plan of Action and Milestones—Who's Responsible for What, and When

Nothing is worse (or more common) than valuable intelligence sent to the file cabinet or placed on a shelf. "Wrap up" reports may contain everything worth knowing. However, like the case study, they may be considered an end in themselves, instead of the beginning.

The best way to ensure that the findings continue receiving proper attention and action is to go the last step in the tabletop process and create the Plan of Action and Milestones, or POA&M, with responsibilities, tracking methods, and milestones/completion dates included. The POA&M is a working document that keeps all stakeholders focused.

Table 1. Notional Plan of Action and Milestones

Goal II	Develop the Concept of Operations (CONOPS) for Employment of the RH-XX Helicopter					
Objective	Description	Action Step	Metric	Responsibility	Completion Date	Remarks
II.1	Develop Supporting Plans	Develop COMM plan	Plan	COMM	31-Dec	
		Develop log support plan	Plan	SUPP	31-Dec	
		Develop trng plan	Plan	Trng	31-Dec	
		Develop deployment plan	Plan	OPS	31-Dec	
		Develop Elec Order of Battle	EOP	Intel	31-Dec	1st draft submitted
II.2	Develop Tabletop Exercise	Establish data requirements	Spreadsheet	Intel	15-Sep	
		Develop goals, objectives & metrics	List	OPS/Sponsor	1-Oct	
		Develop TACSIT	TACSIT	OPS/Sponsor	1-Oct	
		Establish participants	List	Sponsor	15-Oct	Completed
II.3	Conduct Tabletop	Conduct tabletop	Objectives	All	15-Feb	Monitor progress weekly
		Collect data	Data	All	15-Feb	
		Model/simulate	Findings	All	15-Feb	

Case studies can tell us a great deal about the past but very little about the present and virtually nothing about the future, unless we are determined to repeat the same mistakes over and over again.

Table 1 takes a notional program goal, breaks it down into objectives, assigns responsibilities and completion dates. Here is where you legitimize those otherwise lofty TLR goals in an actionable format that can be tracked by all stakeholders. Again, Table 1 is not from any actual contract or program.

Managing the POA&M on an EXCEL spreadsheet (and perhaps on a network) makes it easy for stakeholders to track, update and follow up, without need for special meetings or supplemental reports.

Case studies can tell us a great deal about the past but very little about the present and virtually nothing about the future, unless we are determined to repeat the same mistakes over and over again. DoD should take whatever worthwhile case study/history data it can extract from the past and use it to inform and predict the future—discarding what it doesn't need and modeling the rest to enhance what it does need.

Tabletop exercises can provide a cost-effective method of exercising missions, concepts and products, while causing minimal disruption to real-world operations. Modeling and simulating events and conditions effectively raise the level of operational and training awareness and proficiency.

The POA&M is a management tool and not just a wrap-up report—and it's the only report that the tabletop needs. The work to be done (however formidable) is broken down into dynamic, actionable component steps. Responsibilities and completion dates (milestones) are tracked at all levels.

DoD acquisition can profit greatly by the increased use of tabletop exercises and wargames.

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Improving Opportunity Analysis

Robert D. Frum, DCS

IDENTIFYING, EVALUATING AND COMMUNICATING OPPORTUNITIES SHOULD BE A BEST PRACTICE FOR every business investment analysis. Fundamentally, business investment decisions are initiated for two reasons—to increase the potential for gain or to reduce the possibility of loss.

Investments result in a range between two possible outcomes, incurring either a benefit or a loss. The break-even point, no net loss or gain, may be considered a positive result for preservation of resources. Investment decisions, even when proactively seeking an improvement to add value, typically focus towards mitigating potential negative outcomes and, deliberately or not, apply a risk mitigation approach intended to reduce the possibility of loss.

The Project Management Institute (PMI) defined project risk as “an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives.” The positive effect may be classified as opportunity that could support value maximization—the return outweighs the cost.

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The Department of Defense (DoD) *Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs* (RIO) states, “Opportunities are potential future benefits to the program’s cost, schedule, and/or performance baseline, usually achieved through proactive steps that include allocation of resources.” Though risk identification and associated risk management plans are often mandated in order to minimize loss, an opportunity model—including opportunity costs and passed-up potential opportunities—typically is not included in decision-making apart from possibly a lean component of Strength, Weakness, Opportunity and Threat (SWOT) analysis.

Improving the opportunity model would not only better inform investment decisions, but also may improve economic efficiency if selected opportunities result in a more productive use of resources. For example, the opportunity to reduce redundancies among business units might yield greater value than the potential return on alternative investment decisions taken by the individual business units. An opportunity model should illuminate such strategic possibilities for the decision maker to consider. Strategic business decisions to further organizational objectives must go beyond narrowly considering the downside based on the traditional risk analysis paradigm. Risk characteristically is evaluated as the relationship of the scales for two variables—probability and impact, represented respectively as conventions (x) and (y). Applying a similar approach for opportunity analysis, with inclusion of a third variable scale (z) for investment resources, would enable more detailed decomposition to identify potential options or reveal hidden value.

Traditional Approach

Investment decisions focusing on risk tolerance often base decisions on simplistic single-point green (low), yellow (medium) and red (high) visual indicators that typically are represented in the form of a five-cell-by-five-cell color-coded table derived from probability and impact scales. Each of the 25 cells in the risk matrix heat map provides the measure of risk derived from associated qualitative translations of likelihood from “not likely” to “near certainty” and consequence ranging from “minimal impact” to “critical impact.” As a business investment decision support tool, the color-coded representation is rudimentary for presenting opportunity and ineffective for articulating quantified risk.

Industry employs more complex models, often accompanied with statistical analysis. For example, National Weather Service forecasting calculates the likelihood for a significant number of variables to estimate impacts such as precipitation, temperature and cloud cover. In cases where in-depth opportunity and risk analysis are impractical or inappropriate, subject-matter experts (SMEs) are good

sources for identifying and assigning accurate values to the opportunity decision variables—and for recommending key variables to focus on. The fundamental risk variables of probability and impact are important starting points yet remain exiguous without correlation to investment constraints for informed allocation of resources.

Improving cost, schedule and/or performance is often equated to offsetting or decreasing negative impacts. Risk mitigation is a reactive plan against potential loss or under performance while an opportunity strategy is proactive for possible gain or over-performance. Risk fundamentally is based upon the likelihood of an event and a resulting bad impact. Risk and opportunity are inverse—risk worsens and opportunity improves as probability and impact increase.

While brainstorming often hypothesizes possibilities based upon unconstrained resources, the practical application of available investment resources for risk mitigation and opportunity exploitation limits the collection of useful points to a smaller range of values. Uncertainty (x), which exists for both risk and opportunity, is the probability expressed as a positive value between 0.0 (cannot occur) and 1.0 (certain occurrence); as risk is a tentative future event, 0 and 1 denote definitive results and are not included. Impact (y) may have a negative (risk) or positive (opportunity) effect, calculated as an interval numerical value (which may be derived from an ordinal scale such as low, medium and high). Available resources (z) further limit the opportunity outcome space.

Opportunity Defined

Opportunity (O) represents the value placed upon a potential benefit, such as typical project control metrics that deliver net savings derived from improved cost or schedule results. More difficult to specify are intangible benefits derived from faster decision-to-answer time or improved organizational performance in essential planning, organizing, directing and controlling operations. SME knowledge, supplemented with historical and industry statistics, may be a reliable source to both articulate the benefit variables such as cost/schedule/performance and also to accurately define the probability and impact variable numerical values.

Lower-case theta (θ) from the Greek alphabet can represent the opportunity model. Calculating the quantitative values for x (uncertainty), y (impact) and z (resource) for an opportunity θ yields the opportunity score. The opportunity model θ assumes as true that, for each type of opportunity, whether characterized by one or more constituent criteria, there is but one possible mutually exclusive single best choice that would maximize return value, the selection cannot be divided by, for example, an investor

Improving the opportunity model would not only better inform investment decisions, but also may improve economic efficiency if selected opportunities result in a more productive use of resources.

placing a combination of funds in two or more certificates of deposit.

In order to more definitely determine that the selected opportunity is valued above any alternative opportunities, we need an equivalent opportunity cost examination in which diverse opportunities are compared based upon a common value, at least at an exploratory magnitude. For example, an investor examining certificates of deposit at various financial institutions may consider not only the interest rates but also 24/7 account access, customer support, length of deposit requirements, physical versus online only commerce, etc.—all factors evaluated against a common and consistent quantitative scoring method—in choosing one institution over another.

Opportunity Model

After a potential opportunity has been identified, it must be quantified accurately in order to find a numerical evaluation. Simply stating that the organization wants to increase production while becoming more efficient is a general goal that is too ambiguous to permit measurement. The opportunity must provide a specific, well-defined and assessable value. Adding specificity such as increasing production by 10 percent while becoming 5 percent more efficient within 12 months is a sufficiently quantified outcome objective.

If the organization pursues an opportunity, then accurate, relevant, practical and computable performance measures must be applied to quantified resources to permit the use of input, process, output and outcome to evaluate expected results. The organization's strategy is an appropriate starting point in which mission priorities, objectives and initiatives—all predetermined as important to the organization—can inform opportunity construction, leading to selecting the most promising from possible alternatives. It may prove difficult to compare opportunities when the units of measure are not equivalent. For example, an investment that facilitates faster decisions may need to be compared against employee training that improves record processing accuracy. The organization would benefit from each alternative, but resource constraints may allow for just one investment selection.

The following are elements in the opportunity model:

Equivalent Decision Variables. Opportunity options—primary and alternate, if applicable—may be dissimilar, making comparison and choice decisions more difficult. The quantity of resources required for each possible selection becomes the basis for comparing alternative choices and calculating opportunity cost among dissimilar options. The options must first be reduced to their equivalent per unit basis, such as the miles per gallon gasoline equivalent (MPGe) used by the Environmental Protection Agency to compare electric to gas vehicle fuel economy and average distance traveled per unit of energy consumed. Expressing each opportunity in logically equivalent terms enables determination of the Opportunity cost (Oc) equals (selected option cost) minus (the unselected next best alternate option cost).

Constraints. Examples of limits or restrictions include: How much can be afforded to invest; how much loss is affordable to attain the desired effect; whether the opportunity is time-bound; and how many units of each type can be processed by each person in the same time. Are there legal specifications? Constraints must be understood to determine if opportunity equivalency comparisons are appropriate. Opportunity identification should also establish threshold cost-benefit performance measures such as those taken from strategic objective targets, existing performance and practice measures, resource or capacity constraints, legal or policy standards, analysis of similar organizations, industry statistics or best-practice benchmarks. The threshold should define that point at which if the organization can do better, then how much better per unit invested? The costs avoided or dollars gained by a program must be defined. The SME may again play an essential role in determining opportunity, uncertainty, impact and constraints within their areas.

Opportunity Triplet

Representing the opportunity theta θ values as ordered triplets (x, y, z) based on a scenario that characterizes the business objective in terms of enumerated variables will permit mathematically solving the ordered triple in ways meaningful to real-world applications. For example, the

organization might determine that the risk associated with a phishing and social engineering attack has the average impact cost of \$1.6 million (M) and that the likelihood of a targeted user clicking on the malicious attachment or link is 0.02736, with the equation showing risk value = (\$1.6M x 0.02736) = \$43,776. Examining potential opportunities to reduce or offset the attack risk may increase cost savings (spending less than \$43,776 for training) and training benefits (more flexible training scheduling) for performing security awareness and training in-house rather than outsourcing. For example:

- x = possibility expressed as a probability; based upon best empirical data.
- y = impact measured as accurate, meaningful and quantitative in order to answer the business impact question: How significant would the benefit or value of the opportunity be to the organization? A basic impact scale similar to the risk likelihood criteria described by DoD RIO in Table 1 would assess opportunity based upon Likert scales ranging from “minimal impact” to “critical impact.” The SMEs as domain knowledge authorities provide insight in assessing impact as they are typically more knowledgeable than others regarding consequences within their area.
- z = investment resources quantified as the positive range assets available such as funds, personnel and time to pursue objectives. As previously expressed, a common unit of measurement is required to determine opportunity value (opportunity cost = selected option cost minus not selected next best alternative option cost).

The (x, y, z) ordered triplet of numbers in this model represents the value of opportunity cost. After establishing the ordered triplet variable values, determining the opportunity value is a relatively straightforward point computation. Table 2 provides a scenario in which the value of z represents varied resource values, indicating that Opportunity 1 would require a higher investment but could yield a higher result with $O_c = (\$22,500 \text{ minus } \$12,000) = \$10,500$. Table 3 provides a scenario in which z is a fixed value, and the range of an individual opportunity option would be the difference between the worth assigned to the highest and lowest triplet values. For example, a gambler with a single \$100

chip to wager must decide whether a win with one roll of the dice (O1), one card draw (O2) or one slot machine spin (O3) would yield the best desired outcome.

Conclusions and Recommendations

To remain competitive, enterprises continually seek opportunities to improve their business; both opportunity recognition and opportunity exploitation are positively associated with innovation. Opportunity is incorporated

Table 1. Typical Likelihood Criteria

Level	Likelihood	Probability of Occurrence
5	Near Certainty	> 80% to ≤ 99%
4	Highly Likely	> 60% to ≤ 80%
3	Likely	>40% to ≤ 60%
2	Low Likelihood	> 20% to ≤40%
1	Not Likely	> 1% to ≤ 20%

Source: DoD Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs.

Key: > = greater than; ≤ = same or less than

Table 2. Comparing Two Different Opportunities with Cost as Unit of Measure

Variable	Opportunity 1	Opportunity 2
x (likelihood)	0.75	0.60
y (impact)	3	4
z (investment)	\$10,000	\$5,000
$\theta = (x) \times (y) \times (z)$	\$22,500	\$12,000

Note. Opportunity Cost $O_c = (O_1 \text{ minus } O_2) = (\$22,500 \text{ minus } \$12,000) = \$10,500$

Source: The author

Table 3. Comparing Three Opportunities in One Group with Same z Value

Variable	Opportunity 1	Opportunity 2	Opportunity 3
x (likelihood)	0.75	0.60	0.40
y (impact)	3	4	5
z (investment)	\$100	\$100	\$100
$\theta = (x) \times (y) \times (z)$	\$225	\$240 (high)	\$200 (low)

Note. Opportunity Range = $(O_2 \text{ minus } O_3) = (\$240 \text{ minus } \$200) = \$40$

Source: The author

into capital budgeting decisions based upon economic cost-benefit analysis of investment projects. The absence of competitive market forces generally reduces the imperative to pursue opportunity and innovation that often are accompanied by change and disruption.

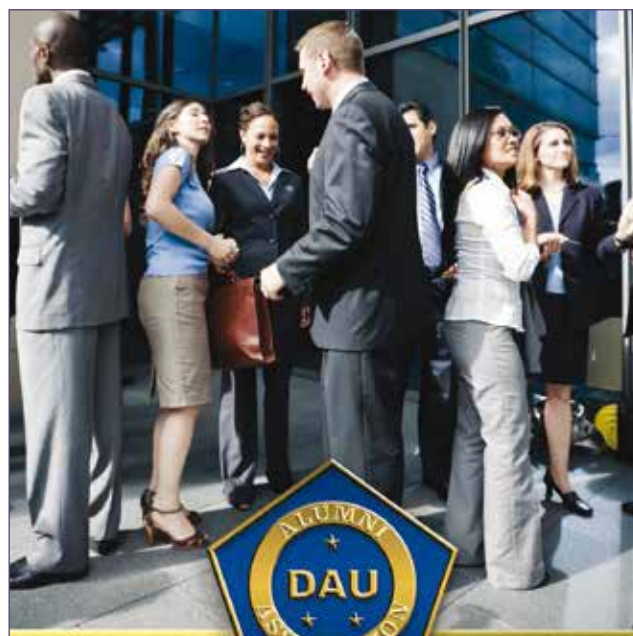
Opportunity as described by DoD RIO covers 5 pages, including a single opportunity management vignette, whereas risk management covers 23 pages. DoD's Operation of the Defense Acquisition System program guidance mentions "risk" 212 times and "opportunity" four times. The different attention allotted to the two topics reveals the prominence given mitigating the downside and the lack of emphasis on exploring and quantifiably articulating the upside, effectively incentivizing risk aversion, in offices other than those specifically focused on innovation.

The basic high-level risk model typically depicts a 5x5 cell matrix in which the combination of likelihood and impact determine a color coded risk level for low (green), moderate (yellow) and high (red). As a business investment decision support tool, the color-coded representation is insufficient for articulating quantified risk probability distributions for a range of possible outcomes for any meaningful choice of action. Beyond signaling candidate areas for in-depth analysis, the same approach is an insufficient opportunity framework, particularly to facilitate goal achievement. Opportunity estimation must become more than a cursory mirror approach to risk management, communicated as abstract qualitative concepts represented in terms of three colors. Calculating the likelihood, impact and resource triplet provides an improved opportunity model to quantitatively explore initiatives that may yield potential improvements in cost, schedule, and/or performance. Measurable opportunity evaluation should become an integral part of defense acquisition program management and systems engineering, elaborated in a range of policy, regulatory and statutory directives.

To improve opportunity analysis, I recommend the following:

- Incorporate opportunity equivalency and opportunity cost in DoD guides that address opportunity, particularly in the Acquisition field.
- Require the opportunity theta model based upon ordered triplets in which x represents possibility expressed as a probability, y represents impact requiring an accurate, meaningful and quantitative measurement, and z represents investment resources for all potential investment decisions exceeding \$1 million.

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7 Traits of High-Performing Acquisition Teams

Brian Schultz

WORKING ON A HIGH-PERFORMING TEAM CAN BE ONE OF THE MOST ENJOYABLE AND REWARDING work experiences in any career field. Since integrated product teams plan and execute our acquisition programs, acquisition results will improve if we develop better performing teams. While the environment in defense acquisition is fast paced, highly pressured and often filled with chaos, it also provides many opportunities for teams to innovate and excel. So, what factors separate the best teams from others and how do we grow high-performing teams?

I previously discussed negative team behaviors in an article titled “The Seven Lethal Acquisition Diseases” (*Defense AT&L*, January–February 2017). With each of the seven diseases, I identified preventive medicine to help avoid them. The

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remedies have links to many of the positive aspects associated with high-performing teams. Building on these positive team traits can help teams avoid the poor behaviors. However, even high-performing teams occasionally will have members who succumb to these and other negative behaviors we called diseases. The teammates must hold each other accountable when this occurs to get behavior back on track.

The conclusions that follow reflect my observations from 4 decades of team experiences in acquisition. The discussion targets program office teams who are responsible for planning and executing acquisition programs. The list could be longer but I picked the top seven, similar to the seven most lethal diseases.

1. Commitment

“The quality of a person’s life is in direct proportion to their commitment to excellence, regardless of their chosen field of endeavor.”

—Vince Lombardi, famed Green Bay Packers coach

Results in defense acquisition have significant and meaningful consequences. A rewarding part of our acquisition profession is the opportunity to take on big challenges. These challenges can seem daunting and impossible to overcome. However, great teams do not shy away from these challenges because they know that, with the right resources and dedication, they can achieve just about anything.

One of my teams worked on a program that was re-baselined after significant cost growth and technical problems. Even with a new baseline that gave the team another chance to execute and deliver the capability, many doubters were skeptical about the chance for success. This collective skepticism motivated us as we committed to deliver despite the lack of stakeholder belief in us. As we achieved some interim successes and gained momentum, the commitment and energy of the team grew. Eventually, after a few years of hard work, we succeeded and gained approval from the users to deploy the system within the re-baselined program constraints. These team members would not allow doubt and negativity to affect their desire to succeed. The team celebration at the deployment event was a great one we all remember!

2. Team Rules

“The culture of a workplace—an organization’s values, norms and practices—has a huge impact on our happiness and success.”

—Adam Grant, psychologist and author

Teams need a set of rules that govern how they will operate. Members should discuss and agree to the rules when

the team forms. As new members come on board, it is important to discuss and share the norms to ensure common expectations for events such as team meetings and other interactions.

Team meetings take time away from individual work. Staff can become frustrated when they feel that team meetings are a waste of time or do not result in productive sessions. The use of team norms can help alleviate this problem by ensuring everyone understands how the team will operate. These norms, some of which may be unwritten, do not guarantee success but are critical for high-performing teams. There is plenty of research to validate this observation, including Google’s Project Aristotle study of effective teams within Google.

I remember a dysfunctional team that had difficulty starting the weekly team meeting on time. Key players would show up late, wasting others’ time without any concern. It eventually became a running joke to ask what time does the 10:00 a.m. meeting start this week. This behavior sent a message that our time was not considered important.

What norms are most important? That is up to the team to decide. The norms I have used often are very simple and straightforward. We respect and listen to each other. We give all members equal time to share their thoughts. We share important information. We take care of each other, especially when one needs support or assistance. We come to meetings on time and prepared. We ensure we meet our team commitments.

3. “Healthy” Conflict

“Conflict, when handled correctly, strengthens.”

—Benjamin Watson, author and former professional athlete

Teamwork invariably will create some disagreements and conflict. Functional managers and other staff look at an issue from a perspective shaped by their experience, training and skills. This can create conflicting interests. For example, a logistics manager will seek to minimize the future operating and support costs associated with a potential engineering change while the engineer is more concerned with technical performance. Both have valid concerns; but we must compromise, as we cannot optimize everything and trade-offs will be inevitable. Team conflict also can result from differences in personalities, beliefs, values and goals.

I remember many healthy debates with one of my technical directors. Our discussions could become “high energy” and occasionally boisterous. Some of these debates led to interesting compromises that helped us design a better

way forward. While we often disagreed on matters, we did not take the disagreements personally. Instead, we used the back-and-forth discussion to explore the multiple perspectives and considerations of the decision. We both realized that the discussions were necessary to vet important issues. Neither of us wanted to accept important plans and strategies without a robust discussion of the pros, cons and risks.

Conflict in teams can become detrimental to team performance. Signs of unhealthy conflict include disrespectful behavior and anger that can worsen if not managed. Team leaders should recognize these signs and take appropriate actions to manage this conflict before it escalates.

4. Creativity

“Creativity is contagious. Pass it on.”
—Albert Einstein, a founder of modern physics

The ability to generate good ideas is critical to team performance, especially in high-technology fields like defense acquisition. Creativity is a key element of critical thinking and helps teams find solutions to seemingly insurmountable challenges. Good ideas do not typically just pop up out of thin air. One team member suggests an idea and it can trigger a new idea or we modify the original idea. The use of creative thinking helps teams generate ideas that lead to solutions and strategies. Creative thinking is a skill that develops with training and practice. High-performing teams make sure that they develop this skill.

A few years ago, the Air Staff tasked my organization with developing a process for verifying an export license proviso of a direct commercial sale weapon system. The process to verify the proviso was not clear since this action was unprecedented and the export system under the commercial contract was not in the Department of Defense (DoD) inventory. To complicate matters, our program office team had no contractual relationship with the prime contractor since it was a commercial sale. We wanted a way to leverage existing efforts aimed at avoiding impacts to the contractor and the allied partner.

Our team employed several creative thinking sessions to identify and vet different ideas. We eventually settled on a new process that utilized existing architecture and interoperability models but employed them in a unique manner. The new process involved getting buy-in from multiple operational and requirements commands. It was widely accepted and worked so well that we expanded its use to other programs. The creativity of a few engineers collaborating with the larger team led to this success. Creativity, if channeled effectively, leads to great ideas that lead to great outcomes.

5. People-First Culture

“I worry that business leaders are more interested in material gain than they are in having the patience to build up a strong organization, and a strong organization starts with caring for their people.”

—John Wooden, famed California basketball coach

We often hear about how people are our most important asset. Taking care of our staffs and their individual needs must be a priority at all levels of the program office. Building a people-first culture helps lay the foundation for high-performing teams. When they first arrive, many program managers (PMs) use a climate survey to set an emotional intelligence baseline of the organization and identify areas that need improvement. The follow-up actions after the survey are critical because they send a message that we want to address and improve our shortcomings.

One of the most rewarding things one can do is help a colleague grow as a professional and observe the payback from the efforts. We hired a junior project manager who was struggling with the transition from an operational environment to the acquisition career field. She previously followed checklists in her daily routine and issues were resolved with very clear courses of action. She liked the people on her team but became frustrated with the uncertain nature of decision making on her program and was considering a career change. We spent a lot of time working with her to adjust to this uncertain and chaotic environment. We even suggested that she consider other jobs if this was not working well for her. She might do herself a favor and free up an opportunity for someone who would love to have the job.

She eventually started to learn and experiment with new techniques. Before long, she and her team accomplished some successful milestones and the team started to excel. She became one of our best performers and eventually earned a promotion and moved on to a greater challenge. It was great to see how our collective efforts helped her grow into a successful leader who overcame her initial frustrations.

6. Passion

“If you love your work, you’ll be out there every day trying to do it the best you possibly can, and pretty soon everybody around will catch the passion from you—like a fever.”

—Sam Walton, founder of Walmart

This trait is associated with the professional enjoyment and satisfaction of our job. It also provides employees meaningful purpose for their hard work. Employees can easily lose sight of the “big picture” and the importance of

their role in achieving long-term success. If you observe the behaviors of those who possess a passion for the job, you will likely see assertive and thoughtful actions and a clear understanding of the team's vision. Teams that possess passion do not accept the status quo and seek new approaches and ways to improve.

Passion on the job is not often present for many reasons. A recent *Gallup State of the Global Workplace* reported that only 34 percent of employees consider themselves engaged. In other words, in a team of 10 people, only three might be motivated. So, how do we get the other seven individuals engaged so they can help improve team performance?

My experience suggests a genuine passion for the job manifests itself in the energy and focus we bring to the job. This energy can be contagious, as others observe and want to join in. Word spreads that your office is a great place to work and grow.

I always will remember a team working a high-priority aircraft upgrade. Several team members were getting on in years. We even had a few who suffered from significant health problems, including more than one heart attack. Rather than retire or take extended medical leave, these teammates came back to work as soon as possible. More than one made it clear to me that the best medicine for them was to be back on the job they loved!

7. Autonomy

“A leader is best when people barely know he exists; when his work is done, his aim fulfilled, they will say: we did it ourselves.”
—Lao Tzu, ancient Chinese philosopher

Clarence “Kelly” Johnson of Lockheed Skunkworks accomplished significant and challenging achievements from the late 1930s through the early 1980s. His teams successfully developed and fielded many aircraft, including the F-80 (DoD's first fighter jet), the U-2, the SR-71, and many others. His 14 rules of management share some of the themes we discussed. His first rule highlights the importance of autonomy. Rule 1: “The Skunk Works manager must be delegated practically complete control of his program in all aspects. He should report to a division president or higher.” As Johnson stated, autonomy does not mean zero oversight because the PM reports directly to a senior manager. More importantly, the quote provides the clear expectation that the PM controls program decisions.

I received an appreciation of autonomy in my first Air Force active duty assignment. My supervisor chartered me with management responsibility for a couple of small projects. He made it clear that I was responsible for managing the

cost, schedule and performance outcomes. I was free to make decisions in coordination with my team. He explained that I needed to work closely with and rely on my experienced team members who had the subject-matter expertise needed for our mission domain. He also offered to help me learn the job and was a great mentor.

This level of autonomy was not what I was expecting as a new, inexperienced officer. However, it made a big impression. I learned quickly by observing team behaviors and asking questions. Team members discussed important decisions without asking for permission from above, although robust coordination and communication occurred as part of the team battle rhythm. This program office cultivated an empowerment culture that was evident in all other teams across the organization as well. The organization delivered great results and earned multiple team awards.

Not all program office teams receive autonomy because it requires a high level of trust and risk taking that is counter to some organizational cultures. Leaders can change the dynamics, and that is exactly what happened to this organization of my first assignment. A new PM came on board who was not comfortable with the high level of autonomy and started reeling in more decisions to his level. People got the message that they could not be trusted. It did not take long for team performance and morale to suffer. Unfortunately, this change transformed the team environment in a very negative way.

Final Thoughts

High-performing traits do not appear overnight in teams. PMs must establish an accommodating culture to ensure that the traits can develop and flourish. The culture provides the foundation that enables these traits. It should establish trust, reward risk taking and demand critical thinking.

The Defense Acquisition University (DAU) and other training organizations offer an array of soft-skills workshops to help teams develop greater effectiveness. Feedback from these events consistently suggest that they are beneficial and worth the time investment. These soft skills are just as or perhaps even more important than some of the hard (technical) skills. Working with you prior to the training event, we can tailor the workshop to address the areas that your team wants to focus on. The list of workshops is available on the DAU.mil website. See (http://icatalog.dau.mil/onlinecatalog/targeted_training.aspx?tab=WSD).

What high-performing traits is your team lacking, and what are you doing about it?

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Faster, Freer, Flexible?

The Zero-Integrator Experiment

Col Jeremy Raley, Ph.D. ■ Fotis Barlos, Ph.D. ■ Christopher Johnson, Ph.D.

THE DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (DARPA) IS RENOWNED FOR TRANSFORMING “impossible” problems into breakthrough innovations such as self-driving vehicles, neurologically controlled prosthetic limbs and artificially intelligent assistants.

Large-scale government acquisition is complex and challenging. Programs often run far over time and over budget, technology becomes outdated halfway through development or, when finally delivered, does not

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truly match operational needs after billions of dollars of investment.

While the outward goal of the DARPA Hallmark program is to revolutionize Space Enterprise Command and Control (C2), we have also taken the opportunity to experiment with a new model of acquisition, a model we call Zero-Integrator. In this article, we define the Zero-Integrator acquisition model, describe its emergence as a strategy for Hallmark, and present perspectives from program participants after our first year of execution.

What Is Zero-Integrator?

Zero-Integrator is an acquisition model in which no single performer is appointed as program integrator, with measures included to ensure that no single performer dominates integration activities. For Hallmark, these measures included rapid evaluation cycles, competition, a strong readiness to end any contract (or the entire program) at any time, and fixed-schedule, fixed-cost contracts.

It is important to note that Zero-Integrator does not mean zero integration. Rather, it means that we set up an environment that encourages participants to integrate in a self-organizing, collaborative manner. We incentivize performers to provide flexible solutions. It means that the government focuses on leadership rather than the details of decision-making.

As we developed the execution strategy for the Hallmark program, the concepts of Zero-Integrator evolved out of our previous acquisition experience, along with inspiration from mobile application development ecosystems, agile development, and cognitive engineering. To begin with, Hallmark aims to develop far future capabilities. How do we build something in the next few years that's still relevant 25 years from now? We can emphasize human effectiveness, flexibility and diversity over set requirements or any specific set of technologies.

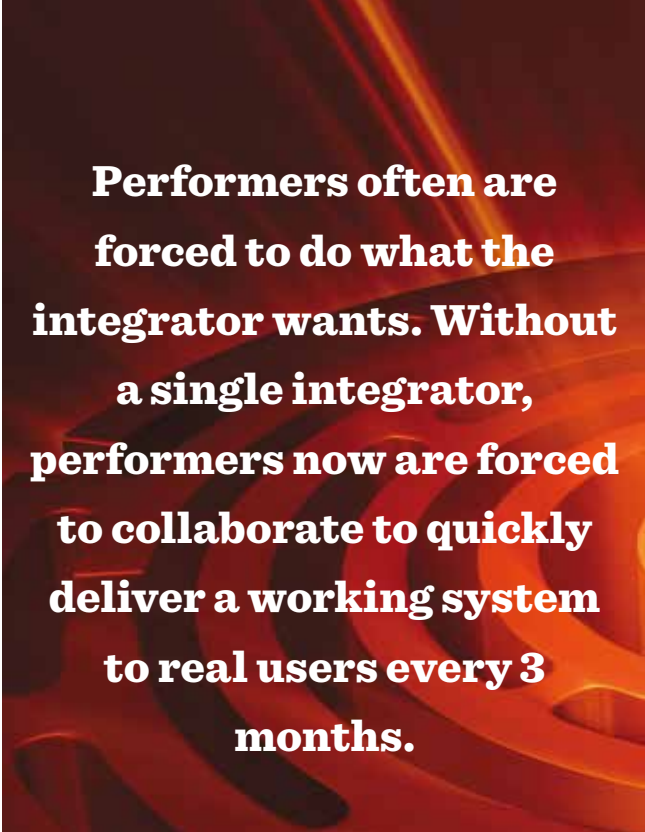
To promote human effectiveness, we use cognitive engineering, which draws from multiple disciplines such as cognitive science, computer science, human-computer interaction and systems engineering to design and evaluate complex human-machine systems. A key element of cognitive engineering is the importance of gathering feedback from real users early and often. To enable continual feedback, Hallmark chose performers to set up an independent testbed where real space operators could exercise realistic space scenarios in a realistic operational environment while interacting with tools developed by a second set of performers. We also selected a third set of performers to perform cognitive evaluations as operators used these tools.

To ensure frequent feedback, Hallmark pulled from agile development methods and set up a fixed schedule of full, weeklong exercise demonstrations every 3 months. This maximizes operator feedback, maximizes opportunities for tools to incorporate operator feedback and evolve in newly discovered directions, and maximizes early discovery of potential technical incompatibilities or misunderstandings between testbed and tool providers.

A fixed, rapid evaluation cycle provides opportunities for flexibility, but what encourages flexibility and diversity is the lack of a designated integrator. While government is always in charge technically, in reality the traditional integrator role holds a lot of leverage over a program. Performers often are forced to do what the integrator wants. Without a single integrator, performers now are forced to collaborate to quickly deliver a working system to real users every 3 months. The rapid evaluation cycle greatly encourages this collaboration: for Hallmark, the 3-month cycle proved to be an appropriate cadence.

Another aspect of Hallmark that encourages flexibility is evolving, organic requirements. There is no set of fixed requirements that each performer has claimed to meet by the end of 2 or 3 years. Each evaluation cycle is driven by the operational scenarios (OpSits) that the entire Hallmark team collaboratively designs to run for each exercise. Success for each evaluation cycle is determined by how well the system supports those scenarios and how well each performer has incorporated operator feedback (as gathered and evaluated by the cognitive evaluation teams) from the previous exercises. Performers are free to say, "but I think you really need this instead," and the government is less likely to hear "that's not in our contract" as an excuse.

Flexibility to evolve also contributes to development and use of diverse tools and technologies, and we wanted diverse tools that followed open standards, were built for portability to future systems, and interchangeable with technologies supporting comparable capabilities. Separating testbed development from the individual tools somewhat encourages abstract system interaction via acquisition programming interfaces. But to really ensure openness and portability, we introduced another element to Hallmark: competition. Primarily, Hallmark selected two testbed performers to build two independent testbed environments. Every 3-month evaluation cycle actually consisted of two back-to-back, weeklong exercise demonstrations, one for each testbed. One cognitive evaluation performer was permanently paired with each testbed performer for the entirety of Hallmark's first 18-month phase, but each tool performer had to successfully run within each testbed environment every 3 months. This forces tool performers to plan for openness up front, encourages even more collaboration across testbed and tool performers, helps



Performers often are forced to do what the integrator wants. Without a single integrator, performers now are forced to collaborate to quickly deliver a working system to real users every 3 months.

pinpoint issues for evaluation—did all tools successfully operate on both testbeds except for this tool? Did all tools successfully operate on one testbed but not the other?—and limits the natural tendency for the testbed to turn into a de facto integrator.

Of course, competition also motivates performers even further to remain flexible and support the program well, and increases the government's leverage if performance issues emerge. Open standards and redundancy of technology also reinforces the government's ability to select the winning technical approach at any time. Although the tool providers were not in direct competition to the extent of the testbed-cognitive evaluation teams, several tools were similar in function (e.g., two front-end user-interface clients, two anomaly detection tools), and Hallmark retained the ability to bring in new tool providers for a second phase of the program.

Finally, to address cost growth, Hallmark introduced an element of fixed-price contract acquisition to the program. All performers had a prescribed budget to support phase one of Hallmark, which they were completely in charge of managing. If a performer burns heavily up front and is unable to support latter evaluation events, then they simply don't participate. This is another case where competition, open standards and technology redundancy help the government retain leverage against cost growth.

What Problems Does Zero-Integrator Solve?

We've described Zero-Integrator as implemented in Hallmark but, again, the core concept remains creation of an

acquisition environment that eliminates the government or any one performer as the program go-between, encouraging all performers toward direct, self-organizing collaboration. We believe this solves several common problems with traditional acquisition.

First, in traditional acquisition, the government often ends up acting as a decision maker between multiple contractors with conflicting interests, especially in associate contractor situations, where performers have contractual requirements to share information, expertise or other resources with each other. By removing government from this role, contractors are forced into a true negotiation with each other, which reduces an extra level of imperfect information when decisions are made by a third-party intermediary. To quote one of the Hallmark project managers, "We actually had to let the engineers talk to each other." For instance, as a testbed, if six different tools ask me for this functionality, it's probably important. And, combined with Hallmark's flexibility, I don't need to go to the government to ask if this is what I should work on next.

This direct negotiation and collaboration also greatly reduces the time required to resolve issues. Think about how problem resolution typically works with the government program manager (PM) as intermediary. Performers first try to work an issue out among themselves for a little bit, then they each take a couple of weeks to build a PowerPoint presentation, then they each come to government separately to give their presentation, then the PM makes their decision, then that decision sometimes has to be referred to the PM's boss, and now a month has been lost. We weren't going to do that in Hallmark, especially combined with rapid 3-month evaluation cycles. Performers need to pick up the phone and talk to each other in order for the program, as well as their own efforts, to succeed.

With greater ownership over design decisions, performers also have increased motivation and buy-in for solutions, and they understand they need to accept responsibility for results, as well as for trade-offs they make in choosing to take on one task over another.

Even if you have brilliant integration documentation, misreadings can still occur and might not be caught until you're too big to fail and too far down to back up. Direct collaboration combined with rapid evaluation cycles means these technical misunderstandings tend to be caught earlier. Even if you spend 3 months on completely the wrong path, you're still likely to spend less money changing direction when solutions are still flexible, rationale is still fresh and the original team members are still involved.

Finally, as discussed earlier, Hallmark fixed cost and schedule to prevent cost and schedule overrun, making performance the primary dependent variable. Because performers have a natural inclination not to let performance slide, we were still able to make good progress while reducing overall variability for the program.

What Problems Does It Create?

On the other hand, any model involves trade-offs. Zero-Integrator introduced several new problems into Hallmark that warrant further refinement of the model. First, program direction can seem ambiguous, especially at the beginning and especially if this is performers' first experience with this kind of flexibility. It can take time for everyone to coalesce into a team and decide on an initial course of action. Performers are accustomed to being told what to do, and PMs are accustomed to jumping in and telling performers what needs to be done.

Instead, PMs should focus on communicating an overall vision for the program and how each performer fits into that vision. This requires leadership and active oversight on the part of the government. While it may seem easy (or appear cavalier to others) to keep telling performers, "Hey, you figure it out," it can actually require more work to focus on leadership instead of decision making. Vision needs to be communicated constantly throughout the program, to all performers. Even though you can pull back from the details of financials and schedules, you still need to stay engaged enough to track performance, inter-performer relationships, progress of the program toward your vision, and ascertain how to course correct when necessary.

This leadership can require more work because milestones, progress and performer selection criteria are often more nebulous, more subjective than quantitative. With the flexibility of Zero-Integrator, you can't necessarily guarantee a

Perspectives From Interviews

What does Zero-Integrator mean to you?

"Participants have the freedom to choose the implementation direction. Everyone has an equal say. Even the PM is considered an equal team member."

"No one's holding the whip. Everyone has a say. It's up to you to define your goals and decide how to work with others."

"A traditional integrator is often seen as a gatekeeper or constraint. In Zero-Integrator, people are 'free' to work on whatever they think is needed."

"No single point bottleneck is limiting system integration."

"No single performer is critical to the program's success. Even the testbeds could be switched out if necessary."

"It's as if you're building a house, and you decide to hire and work with the tradesmen directly instead of hiring a general contractor."

What has been your favorite element of Zero-Integrator?

"The ability to build relationships, it feels like there's more teamwork compared to other programs. It's refreshing to have a shared, vested interest, it automatically inspires teamwork."

"Ten tools coming together in 9 weeks, I've never seen that in my years as a [performer] PM, that's a 'wow.'"

"Cognitive engineering is integral, built into the program."

"Direct interaction between software developers and end users."

"Seeing such rapid progress has been ... I would say 'remarkable' compared to traditional programs. It's common to have only annual [demonstration] events."

What has been difficult or challenging?

"What to do when a performer doesn't participate. Do others take up the slack, overwork?"

"Early on, forming the teams, establishing a cadence."

"It's like when you tell your friends, 'Hey, let's get together and do something sometime.' Someone needs to take charge and make a plan."

"Chasing down information from tool providers, incorporating last minute changes into training."

"No one is directing tool performers to take our recommendations."

"It's unclear how competition is evaluated, there's too many variables, like comparing apples to oranges. There are benefits of going first. Tools are constantly improving, even week to week, you can't compare between sessions."

specific capability at a specific maturity and performance level on a specific date. (But again, the beauty of Zero-Integrator is that you may instead pursue a feature you've discovered is more critical to program success.) Evaluation of performers no longer hangs on how many lines of code you wrote or how many features you delivered this quarter; it requires judgement calls on how well performers are co-operating with the model and with each other, what kinds of progress they are making between evaluation events, and how focused they are on supporting the end user.

Finally, ambiguity can still extend to the process for resolving conflicted interests. Performers may continue to ask the government for assistance; in Hallmark, it has helped to mentor more than direct, to ask which decision would fit more with the vision of the program or support the operator more effectively.

"I wouldn't want to support 90-day cycles for an entire 5-year program."

If you were suddenly in charge, what one thing would you change?

"Having two testbeds is a serious detriment, it breaks the communication chain."

"I think we're overly focused on cognitive evaluation, there's no feedback on other areas."

"Ten tools, two testbeds. Only two tools are user-facing, cognitive evaluation focuses on those."

"Provide more explicit prioritization to feedback recommendations between evaluation cycles."

"There's too many lines of communication, communication needs to be more centralized."

"Integrate things more quickly from the beginning."

"Give ownership of data to the testbeds, data facilitates integration."

"Get rid of competition. If not, then really inject competition everywhere, including the tools. Really exercise the threat of being cut."

"Everyone should be allowed to come to all events, otherwise it's not truly collaborative." [Program funding was unable to support the amount of travel that would have been required for every performer to attend every

Initial Perspectives

To learn more about how Zero-Integrator was working for Hallmark, after a year into the program we interviewed members of the testbed and cognitive evaluation teams, as well as members of the government support team, about their experiences. A few of the responses to our questions are in the sidebar on these pages.

To summarize, testbed and cognitive evaluation performers recognized the advanced progress made compared to their experiences with traditional acquisition, enjoyed closer peer working relationships, as well as more direct interaction with end users. However, they were often overwhelmed by the amount of peer-to-peer communication required, and the pace of the evaluation events. They felt that the competition aspect hurt more than helped the primary goal of Zero-Integrator.

planning and evaluation event. Except for initial meetings, event attendance was generally limited to testbed and cognitive evaluation teams. Tool performers were able to call in virtually.]

What advice would you offer a friend about getting involved in a new Zero-Integrator program?

"There needs to be a central, shared, evolving system specification. You still need to have integrator-like artifacts, they can be open-source and version tracked."

"Establish rhythm of communication early on, prepare to adapt. Be assertive in establishing a process."

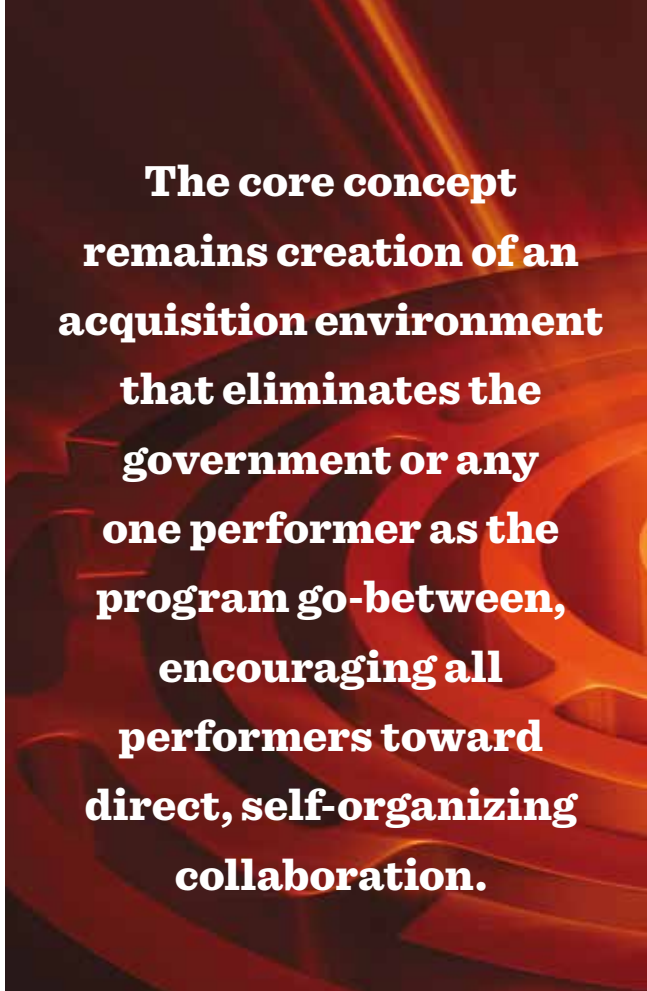
"Feel free to adapt the process, make sure it's right for you."

"Calculate time effort required for extra overhead in ahead of time."

"You will be responsible for group work, your ability to succeed is tied to your ability to cooperate."

"Prepare for flexibility. If you're a small company, you may have great organizational flexibility, but struggle with low individual flexibility in terms of skillset and reach-back to expertise. If you're a large company, you may struggle with too much overhead and bureaucratic inflexibility."

"You need to be fully committed. Communicate. Think outside the box. Expect to wear different hats."



The core concept remains creation of an acquisition environment that eliminates the government or any one performer as the program go-between, encouraging all performers toward direct, self-organizing collaboration.

Everyone floundered at the beginning, of course, as even the government team was still defining what Zero-Integrator really meant in practice. A common recommendation was to provide or encourage teams to immediately establish strong processes and tools that support collaborative integration. We also found that in the course of deciding to fund two testbeds and two cognitive evaluation performers, we overlooked a plan for who would own and provide the common data needed to drive modeling and simulation for the exercises and a plan for who would provide holistic system training for the operators during each exercise.

A key comment mentioned by both testbeds was that, again, Zero-Integrator doesn't mean zero integration. It means finding the optimum balance between structure and process that drives quality without overly constraining solutions.

At the time of our interviews, two evaluation cycles remained for phase one of Hallmark. We would like to expand our interviews to include the tool providers and their perspectives at the conclusion of this first phase.

Is Zero-Integrator Right for You?

In a non-DARPA government organization, is a Zero-Integrator-like model right for your next program, even if it's not research and development? Much depends on your or-

ganizational culture. You'll need tolerance of flexibility and perceived risk. You'll need the ability to embrace a fail fast philosophy and walk away if needed. You'll need to insulate your program from outside stakeholders demanding traditional metrics. You'll need to be willing to allow contractor team decisions without government involvement.

Your program will need to include a critical mass of performers with a diversity of interests, to better avoid deadlock disputes. Your target deliverable will need fault tolerance in initial iterations, with the capability for in-progress reviews and reversible steps. If your first test involves life and death situations, Zero-Integrator probably is not a good fit. Your performers will need the ability to communicate and collaborate without barriers, barriers such as isolation across different security levels, or too much duplication or competition of effort.

In your work as a program manager, is Zero-Integrator right for you? Like your organization, if you are risk-adverse, you will not succeed. You'll need to be highly performing in managing organizational culture as well as technical issues, and handle a more intuitive as opposed to detail-oriented management style. You will need to stay strong in continually communicating your vision without dictating how to achieve it. ("If you give in and give someone a little direction, everyone will want some.")

In your work as a contractor, is Zero-Integrator right for you? Ideally, you've shown past success with agile development. You'll need flexibility to adapt and take on multiple roles. Trying to shoehorn into the program a finished product you want to sell will not work. You'll need to understand how to address higher-level requirements of success rather than rely on low-level metrics. And you'll need strong communication skills and intellectual humility.

Summary

We've described a new acquisition model that we call Zero-Integrator and offered a few of our experiences implementing it within the first year of the DARPA Hallmark program. As a first step, this specific mix of ideas and techniques has worked well for us, but the spirit of Zero-Integrator is to eliminate obstacles to innovation and collaboration while also freezing costs and schedules and staying flexible and true to end user requirements. We hope to see others apply their own mix of ideas to new programs, and we ourselves hope to experiment further with refining Zero-Integrator and applying to different types of programs beyond software research and development.

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DOCUMENTATION **Remains the Key** in GAO Protests

Janel C. Wallace, J.D.

EVERY YEAR, THE GOVERNMENT ACCOUNTABILITY OFFICE (GAO) reports to Congress on its most prevalent basis for sustaining protests. It also advises Congress if any agency failed to follow GAO's recommendations. No agency failed to follow GAO recommendations during the last fiscal year.

The GAO "sustains" a protest when it recommends that the protestor receive some form of relief. The GAO's report for Fiscal Year (FY) 2018 revealed that the rate by which the government sustained protests decreased from 17 percent in FY 2017 (99 cases) to 15 percent (92 cases).

(Editor's Note: The author's examination of the GAO rulings for FY 2016 was published in the January-February 2018 issue of the *Defense Acquisition's* predecessor, *Defense AT&L*, pages 38-43, and the rulings for FY 2017 appeared in the May-June 2018 *Defense AT&L*, pages 43-49.)

Yet, the number of cases filed increased from 2,596 in FY 2017 to 2,607 in FY 2018, indicating that the GAO receiving more protests is not a corollary to its granting relief to protestors. The most frequently cited reasons for sustaining protests in FY 2018 were:

- Unreasonable technical evaluation
- Unreasonable cost or price evaluation
- Flawed selection decision

These three reasons were among the four top reasons in FY 2017 for sustaining protests.

A reading of the example opinions provided by the GAO reveals that inadequate documentation remains a common underlying issue concerning the sustenance of protests. Reading each example opinion will help government agencies determine correct procedure and what procedures to avoid or improve upon to reduce the number of sustained protests.

1 AdvanceMed Corp.

The GAO provides AdvanceMed Corp. (B-415062, B-415062.2, 2017 CPD ¶ 362) as an example of an unreasonable technical

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evaluation. In AdvanceMed Corp., the solicitation issued by the Department of Health and Human Services (HHS) was for a cost-plus award fee task order for program integrity audit and investigation work for Medicare and Medicaid operations. The GAO was able to hear this task order protest because the task order exceeded \$10 million. The GAO has jurisdiction to hear a task order protest on the ground that the order increases the scope, period or maximum value of the contract under which the order is issued; or if the order exceeds \$10 million for civilian agencies (this amount changes to \$25 million for Department of Defense (DoD) order contracts). The basis of the protestor's claim was that the agency did not meaningfully consider the awardee's disclosed organizational conflict of interest (OCI) and that the awardee's proposal was not technically acceptable.

Organizational Conflict of Interest

The protestor argued in its OCI claim that the express language of the solicitation precluded award to the awardee when there is an OCI. The solicitation required offerors to disclose conflicts of interest among other things. It was clear by the solicitation language that disclosure of conflicts of interest was "material" to contract award. The disclosure requirement extended to current and future nonforeign contracts involving the offeror, its parent company and any affiliates that might result in an actual, potential or apparent OCI. The solicitation provided examples of what would be considered actual, potential or apparent OCIs, specifically indicating that performing same or similar functions as the Medicare Administrative Contractor (MAC) or Medicaid Management Information Systems (MMIS) for a state at any time in the jurisdiction where it holds a Unified Program Integrity Contractor (UPIC) contract would also be considered a conflict. In this case, the awardee had such a conflict of interest because it was both a MMIS and a UPIC.

The GAO agreed with the protestor that the agency did not perform a meaningful OCI evaluation. The awardee

The GAO reiterated in this decision that agencies do not have discretion to use an evaluation plan different from the one provided in the solicitation.



was honest in that its proposal did disclose the contracts held by its parent company where there may be an OCI, however, the awardee summarily concluded that there was not an OCI and that mitigation was not required. The agency contracting officer had a few conference calls with the awardee in an effort to clear up the "perceived conflict." The "perceived conflict" language used by the agency bothered the GAO because it conflicted with the language in the solicitation. The solicitation language clearly indicated that the awardee had a conflict.

The GAO noted in its opinion that an agency is obliged to determine if conflicts exist in each procurement, regardless

of whether there was consideration for a similar type of conflict in awarding a task order in a different jurisdiction. It also found that the agency did not provide documentation required in its decision making to show it conducted a proper analysis of the conflict of interest concerns. For example, the contracting officer did not document the conference calls, which disallowed the fulfillment of the duty to identify, evaluate and determine whether there was an OCI.

Technical Evaluation

The other part of the protest in this case involved a claim of an unreasonable technical evaluation. The solicitation provided for a trade-off evaluation with non-cost evaluation factors being significantly more important than cost when combined. One of the non-cost evaluation factors was compliance with Section 508, which requires agencies to make information and communication technology accessible to disabled individuals. The solicitation required that offerors proposing electronic and information technology (EIT) supplies and/or services conform to Section 508 accessibility standards. For an offeror's proposal to be acceptable, it had to include a HHS Section 508 Product Assessment Template (PAT) and demonstrate its ability to meet Section 508 standards for the proposed EIT supplies and/or services. The technical evaluation panel evaluated

all factors except the Section 508 factor. The Section 508 compliance officer evaluated the Section 508 factor. The Section 508 compliance officer did not find any concerns with the protestor's proposal but found that five of the awardee's PATs were unacceptable and required remediation. The protestor asserts that the awardee was to be compliant prior to award, and the GAO agreed.

The agency argued that the solicitation did not require full compliance with Section 508 at the time of contract award, just a demonstrated ability to meet the standards of Section 508. The GAO looked to the solicitation as a whole because the two sides disagreed on its interpretation. The GAO determined that the agency's interpretation was unreasonable since the solicitation used mandatory language. The agency's solicitation made it clear that for an offeror to be technically acceptable, its proposed EIT supplies and/or services must conform to applicable Section 508 standards.

Overall, there were conflicts in the solicitation, and the GAO had to make an interpretation for it to make sense. The agency provided an alternate argument that Section 508 did not apply since the noncompliant EIT supply tool was not going to be used by the Centers for Medicare and Medicaid Services and/or the public. The GAO looked to the solicitation language again and rejected the agency's argument. The GAO reiterated in this decision that agencies do not have discretion to use an evaluation plan different from the one provided in the solicitation. The GAO found the technical evaluation panel and the contracting officer's conclusion unreasonable since the agency based the acceptability rating given to the awardee on remediation that did not take place. In its opinion, the GAO repeated a common phrase that it is a "fundamental procurement principle" that agencies evaluate proposals consistent with the solicitation and that it will question an evaluation when it is unreasonable, inconsistent with the solicitation or not documented.

2 Ensco, Inc.

The GAO provides the decision in Ensco, Inc., B-414844.4 et al., 2018 CPD ¶ 260 as an example of an unreasonable cost or price evaluation. The protest resulted from a solicitation issued by the Defense Threat Reduction Agency for support services on a cost-plus fixed-fee contract.

Proposals were evaluated using trade-off considering in descending order of importance: mission capability, past performance and cost. Mission capability and past performance when combined were significantly more important than cost. Cost was to be evaluated using cost realism and cost reasonableness while also considering cost completeness.

The agency used what it called the most probable cost (MPC) to determine best value to the government. The MPC would adjust an offeror's proposed cost and fee when the agency determines it is appropriate to increase or decrease cost elements to what it considered realistic levels based on its cost realism analysis. The source selection authority used the MPC to determine that the awardee offered the best value to the government. The incumbent then protested to the GAO. The agency responded by voluntarily taking corrective action. Voluntary action is where the GAO does not hear the protest because the agency is working to resolve the issue(s) on its own. It is a common reaction for the agency to take corrective action when a protest is filed with the GAO. The agency allowed for limited proposal revisions and reevaluated the offerors who elected to remain in the competition. The protestor received the highest mark in its management approach and past performance but was rated evenly with the awardee on its technical approach. The protestor's cost was approximately 28 percent higher than that of the awardee. After accomplishing the MPC, the agency increased the protestor's cost estimate for evaluation purposes to be 29.18 percent higher than the awardee. The source selection authority determined that there was not enough value in the protestor's proposal to justify paying the higher price and determined again that the awardee offered the best value to the government. The incumbent protested again, alleging an unreasonable cost realism evaluation.

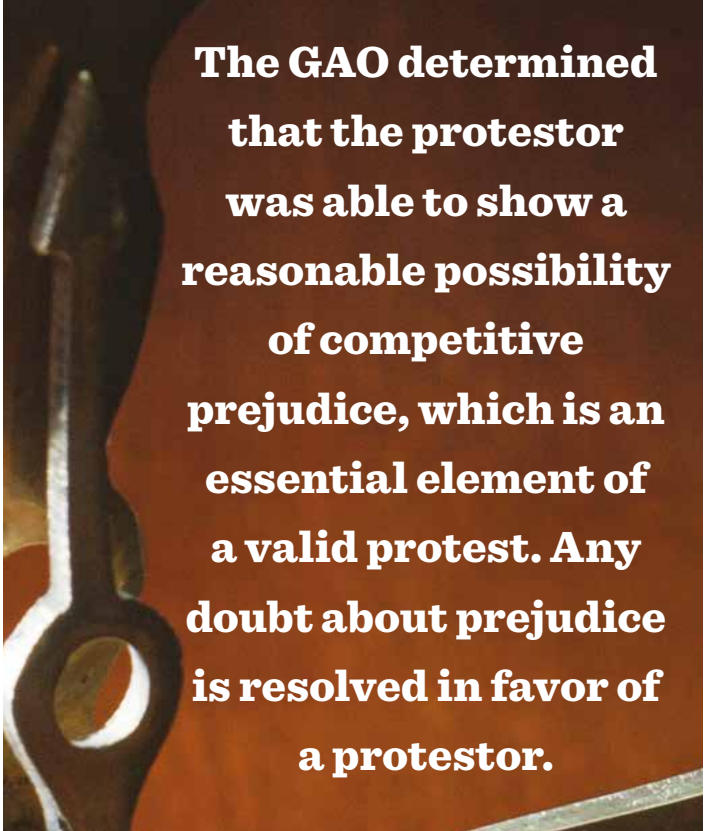
Specifically, the protestor argued that the agency treated it differently than the other offerors by increasing the proposed direct labor rates verified by the Defense Contract Audit Agency (DCAA) and by not adjusting the proposed rates not verified by DCAA. The rate adjustment adversely impacted the protestor because it was the incumbent. As a result, DCAA had many of the protestor's direct rates verified but did not have many of the other offerors' rates verified. Essentially, this allowed the other offerors greater freedom in proposing unrealistic prices. Those proposed unrealistic prices went unchecked by DCAA and the agency. The protestor argued that the cost-price evaluation was unreasonable because the awardee anticipated recruiting the protestor's employees but their direct rates for those employees were proposed lower than the protestor's proposal and therefore were not realistic. The protestor also argued that the agency ignored its 3 percent proposed cost-saving rate reduction. The agency failed to accept the rate reduction proposed because there was inadequate support to accept it.

The GAO found that it was arbitrary and unreasonable to evaluate and adjust direct labor rates for just those employees for which DCAA verified rates without conducting any other analysis. This limited analysis was not adequate to assess cost realism of the proposals and it

was unreasonable for the agency to assess a greater confidence in the awardee's approach to recruit incumbent personnel without performing an analysis on how the lower direct rates proposed would affect the awardee's ability to recruit. The GAO went through the steps the agency took in determining reasonableness, realism and completeness. It agreed that an offeror's proposed costs are not dispositive because, ultimately, the government is required to pay the contractor actual and allowable costs in a cost reimbursement contract, which is why there had to be a cost realism analysis.

The GAO determined that the agency conducted its evaluation of reasonableness, realism and completeness prior to making MPC adjustments. It found that the agency correctly evaluated cost reasonableness using the average total cost of the submitted proposals and the independent government cost estimate (IGCE). There was no disagreement on the development of the IGCE, which considered the rates from the last period of performance of the then current contract and a General Services Administration labor category tool. The GAO noted that the rates included in the IGCE were higher than the awardee's proposed rates, which was important to the GAO, considering there was some room in the pricing for consideration.

The GAO found that, overall, the agency did not conduct a reasonable cost realism analysis. The agency's use of historical direct labor rates verified by DCAA as part of a cost realism evaluation was reasonable, as was its decision to adjust rates to match those currently being performed on other contracts. Therefore, the GAO found that the agency's decision to reject the protestor's proposed 3 percent rate reduction was reasonable. The error that the GAO found was with the agency's exclusive use of DCAA-verified rates without any documentation to explain its lack of analysis or adjustment to the awardee's proposed rates for employees it anticipated recruiting from the protestor, considering the awardee's technical approach. The GAO also questioned the lack of comparison of rates proposed



The GAO determined that the protestor was able to show a reasonable possibility of competitive prejudice, which is an essential element of a valid protest. Any doubt about prejudice is resolved in favor of a protestor.

by other offerors and the agency's failure to use the individual rate information in the IGCE to evaluate proposed rates.

The GAO determined that the protestor was able to show a reasonable possibility of competitive prejudice, which is an essential element of a valid protest. Any doubt about prejudice is resolved in favor of a protestor. The protestor was able to show prejudice because cost was the least important of the three evaluation factors and the protestor was superior in the two more important evaluation criteria (mission capability and past performance). The reasoning in the GAO's decision was that the awardee's MPC would

be greater if the agency evaluated all of the proposed direct labor rates. A cost realism might also find as unrealistic the low rates the awardee proposed to pay possible recruited employees. These evaluations might then affect the agency's overall decision, considering the solicitation's stated relative importance of each evaluation factor and the protestor's superiority under the non-cost factors.

3 VariQ Corp. VariQ Corp., (B-414650.11, B-414650.15, 2018 CPD ¶ 199) illustrated the GAO's third most prevalent ground for sustaining protests—flawed selection decision. In VariQ Corp., the protest was of a task order for information technology (IT) operations support services solicited through a request for quotations. The task order exceeded \$10 million, which allowed the GAO to hear this case. The solicitation informed offerors that evaluation of their quotes considered four factors, in descending order of importance: management approach, technical approach, past performance and price. The nonprice factors, when combined, were significantly more important than price.

After award, the agency received several protests. The agency responded by taking corrective action, which was followed by another protest. The agency responded by amending its corrective action to allow final quotes. Evaluation of the final quotes resulted in the awardee having fewer strengths than the protestor in the management and

technical approach. The awardee had a past performance rating of substantial confidence and the protestor had a past performance rating of satisfactory confidence. The protestor's price was lower than the awardee. The Source Selection Authority (SSA) determined that the awardee's quote was superior under both the management approach and the technical approach evaluation factors even though the awardee received fewer strengths than the protestor. The SSA supported this decision describing the awardee's strengths as "substantial strengths." After award the protestor filed its protest to the GAO, which looked to the agency's solicitation to consider what evaluation was to consist of with respect to the management approach, technical approach and past performance.

Management Approach

Each offeror's management approach was evaluated to determine if that offeror showed the practical level of understanding of the operating environment and management methods needed to accomplish the tasks and deliverables of the Performance Work Statement (PWS)—considering risk and cost-effective ideas. Offerors provided resumés and letters of intent for six key personnel positions, which needed to show that the key personnel proposed possessed the education, expertise, abilities, experience and other relevant technical expertise to do the work successfully. The solicitation provided that a quote may be found unacceptable and the offeror ineligible for award if it did not meet the key personnel qualifications. The solicitation advised offerors that the agency would reject a quote that is not compliant with all of the solicitation requirements. The protestor argued that the agency unreasonably and disparately evaluated the offers and ignored the fact that one of the awardee's proposed key personnel failed to meet the PWS requirements. The GAO agreed, considering the solicitation requirement that the team lead was to have a deep understanding of "high availability" for Microsoft Exchange and database replication strategies as indicated in the PWS. The awardee's proposed team lead had experience with the Army in supervising the quality assurance environment. However, there was no indication in the proposal that the team lead had a deep understanding of "high availability" for Microsoft Exchange and database replication strategies.

The agency argued that a technical evaluation team member had personal knowledge of the Army's quality assurance (QA) team and that the Army QA team was responsible for testing all configurations before they went into production. Therefore, the awardee's proposed team lead had to have a deep understanding of Exchange and its interworking parts. The GAO looked at the evaluation record and found no documentation, particularly its preferred contemporaneous documentation, to support the agency's finding that the awardee had a deep understand-

ing of Exchange and its interworking parts. The GAO reasoned that a QA environment that included Microsoft Exchange would not necessarily include an Exchange environment configured for high availability like that required in the PWS. The GAO determined that the record provided no support for the technical evaluation team member's statements about the experience and knowledge of the awardee's proposed team lead—qualities relied on by the technical evaluation team. There was no personal knowledge of the proposed team lead's past experience with or understanding of Exchange or knowledge of the work actually performed. The agency's conclusion about the awardee's proposed team lead constituted what the GAO referred to as "educated guesswork."

The agency argued that it waived the requirement for the team lead to have a deep understanding of "high availability" for Microsoft Exchange and database replication strategies indicated in the PWS and that the protestor did not suffer prejudice. The GAO disagreed, noting that an agency may waive compliance of a material solicitation requirement in awarding a contract when it concludes the requirement is not necessary to meet the agency's actual needs and where there would be no resulting prejudice. The GAO found that the agency did not waive the requirement and did not determine that the requirement was unnecessary to meet its needs.

Technical Approach

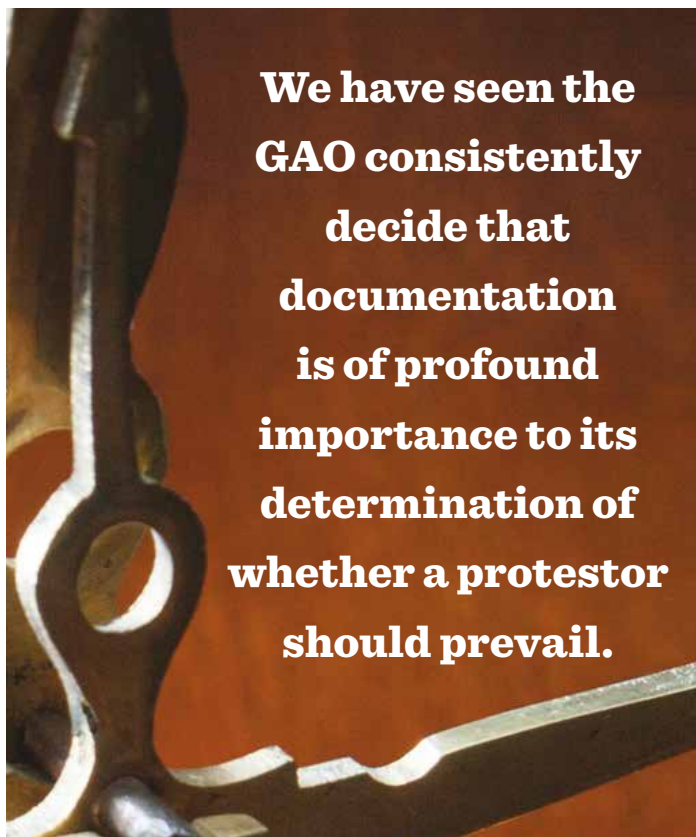
Evaluation of each offeror's technical approach was intended to determine if the offeror demonstrated the knowledge, skill and ability to fulfill certain PWS requirements; demonstrated understanding of IT operations challenges and proposed resolution of those challenges; and had offered recommendations for improvements in knowledge management, remote support, and user self-help. The protestor argued that the agency unreasonably and disparately evaluated quotations under this factor. In particular, "substantial strengths" were more important than number of strengths, and the agency justified award to the awardee under the management approach and technical approach evaluation factors after making a blanket assertion that the awardee had more "substantial strengths." In the protestor's view the issuance of "substantial strengths" were unequally applied because it did not receive a "substantial strength" after showing similar strengths to the awardee. The agency was able to substantiate some of the strengths it determined were the awardee's "substantial strengths" in its contemporaneous documentation but were unable to show that others were valid because of failure to document. The agency's inadequate documentation prevented the GAO's evaluation of the agency's judgment or the reasonableness of the decision in determining whether a strength was a "substantial strength." Lack of documentation also

impacted an assessment of whether the strength was just a strength or a “substantial strength.” For example, there was no documented explanation when the agency noted similar benefits to the protestor and the awardee approaches to shift flexibility but only granted the awardee a substantial strength. The Source Selection Decision Memorandum did not list all of the substantial strengths of the protestor and the awardee even though the justification of award was based on the awardee receiving more “substantial strengths” than the protestor. The GAO ultimately found that there was unequal treatment and that the agency did not adequately document its source selection decision.

Past Performance

The agency’s evaluation of each offeror’s past performance was to determine the breadth and depth of each offeror’s relevant experience on projects of similar size, scope and complexity from the last 3 years performed by the offeror, its subcontractor or both. The protestor argued that the agency incorrectly gave it a satisfactory confidence based on a typographical error indicating the protestor received a “good” rating for a contract reference. In fact, the protestor received an “outstanding” rating, which the agency noted in its Past Performance Evaluation Team (PPET) report.

The agency asserted that the typographical error did not impact the evaluation and that the contract reference would remain as “satisfactory confidence.” The GAO determined that the error was an evaluation mistake and not just a typographical error because the “good” rating was located in the “finding” section of the PPET. This was the contemporaneous record and it clearly stated that the protestor received the “satisfactory confidence” rating because of the “good” rating it received on its contract reference. The GAO also considered the SSA statement in the best-value determination, another contemporaneous record, that the protestor received a “good” rating. The GAO was not convinced that the agency would assign the



protestor a “satisfactory confidence” rating after another evaluation. The GAO’s conclusion was based on the fact that the agency rated the awardee with “substantial confidence” after receiving an “outstanding” rating on a contract reference only partially similar in size, scope and complexity and because the protestor’s other two contract references were rated as “substantial confidence.”

The GAO found that the protestor was prejudiced in that the protestor would have had a substantial chance of winning the contract but for the agency’s actions. The GAO based its finding of prejudice on its review of the facts, the contempora-

neous record and the changes that the GAO determined to be likely after a reasonable evaluation by the agency.

Conclusion

The GAO consistently highlights the flaws in the evaluation process that have been frequent reasons for agency protests. Many protests can be avoided by exercising caution in the evaluation process—such as the agency ensuring that it takes appropriate measures to resolve potential OCIs and evaluating only what was provided as evaluation factors and documenting rationale and results. We have seen the GAO consistently decide that documentation is of profound importance to its determination of whether a protestor should prevail. The GAO will rely on the contemporaneous record, established at the time of the award, over a record supplemented during a protest. The contemporaneous record is more reliable and is less likely to have been modified to bolster the government’s defense.

Documenting an evaluation and including all evaluations are required in order to defend against a protest but are also parts of good recordkeeping. Having a business culture of consistently documenting rationale and conducting fair evaluations are large steps toward reducing the number of future and sustained protests.

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DEFENSEACQUISITION

WRITERS' GUIDELINES IN BRIEF

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Defense Acquisition 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.

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May–June	1 February
July–August	1 April
September–October	1 June
November–December	1 August

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