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Full Speed to the Fleet

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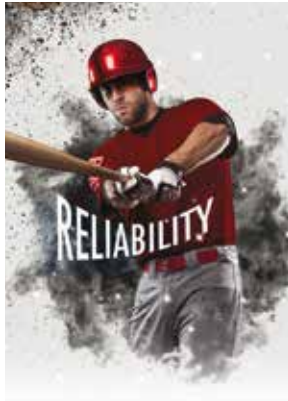
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Weapon Systems
Availability**

**Simulations
Vs. Case Studies
Not “What Happened?”
But “What If?”**

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a Way Forward**

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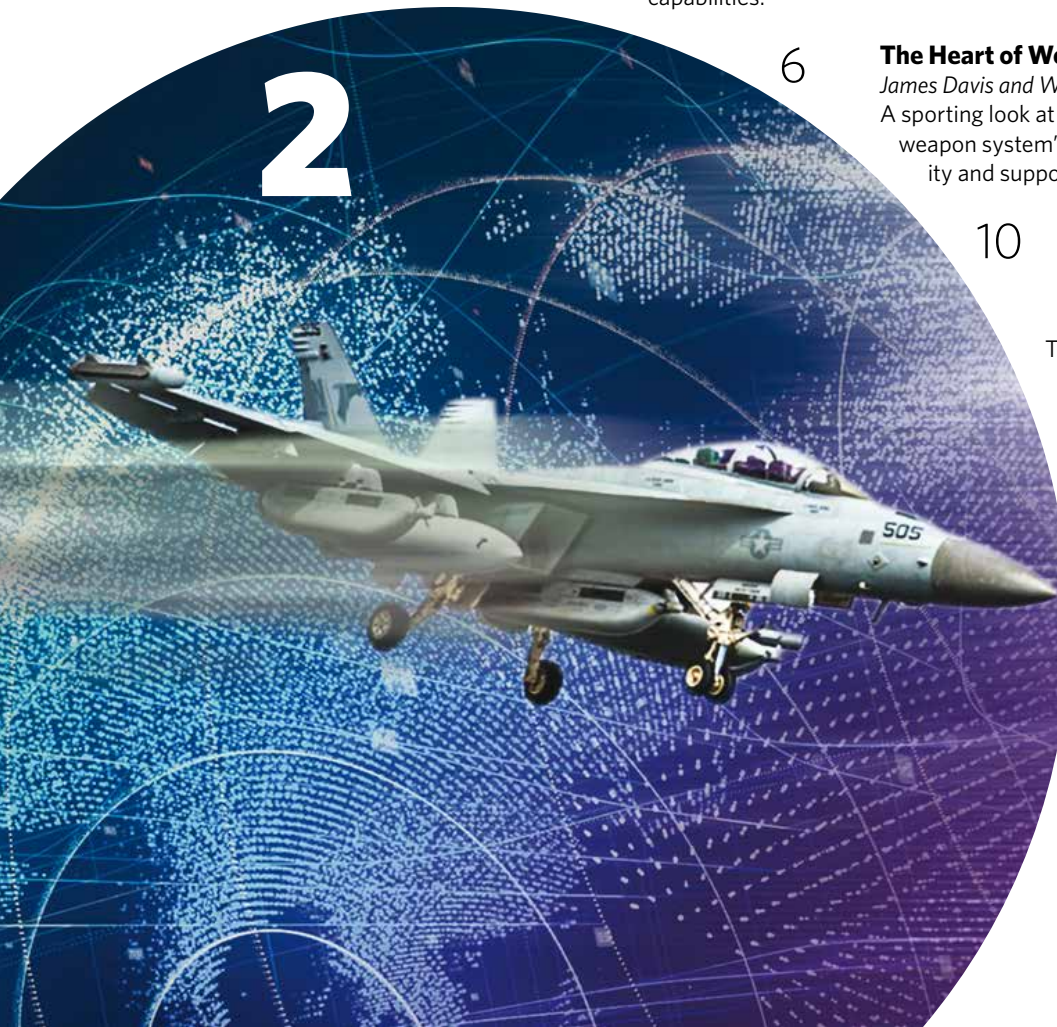
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Full Speed to the Fleet

**Powered by Military-Industry
Partnerships**

LT Trevor DiMarco, USN ■ LT Jeff Bowman, USN

AS CHINA RACES TO ASSERT ITSELF IN THE PACIFIC, ITS RAPID ADVANCES IN AIR-TO-AIR, SURFACE-to-air, and anti-ship kill chains challenge America's historic advantage in military technology. Keeping pace with China's capabilities requires streamlining America's byzantine military acquisition process. One of the greatest challenges is building a process that expedites the traditionally measured pace of testing and tactics development while still ensuring that new technologies are tactically effective and operationally suitable. Meeting that challenge requires partnerships that allow simultaneous testing, tactics development and the integration of urgently needed capabilities into deploying units.

Electronic Attack Squadron 138 (VAQ-138) is an operational EA-18G Growler squadron that spearheaded the integration of new weapons into the Pacific theater. In a single year, the squadron aided the maturation of a major aircraft software upgrade, a 3D-printed device that significantly multiplies the Growler's jamming power, the first ever air-to-surface network-enabled weapons, and a revolutionary leap in anti-ship cruise missile technology.

Bowman and DiMarco fly EA-18G Growlers for the U.S. Navy's expeditionary Electronic Attack Squadron 138 (VAQ-138) based at Naval Air Station Whidbey Island, Washington state. Bowman is Mission Planning Officer and DiMarco is Training Officer for the VAQ-138 program.



VAQ-138 is currently deployed with the technology it helped develop. Its success proves the power of partnerships between industry, test squadrons, weapons schools and deployable units to move capability out of the lab and into the fleet. By implementing administrative support, the Department of Defense (DoD) has an opportunity to transform VAQ-138's experience into a repeatable process. Two projects best illustrate the rewards and challenges of pushing technology directly to operational units: Batwing, a Navy Speed to the Fleet Initiative, and the Long-Range Anti-Ship Missile, which fulfills a Joint Urgent Operational Need.

Batwing

Batwing is an upgraded antenna that dramatically increases the effective power of the Growler's jamming pods. Engineers at the Naval Air Warfare Center (NAWC) designed the antenna and produced a prototype in just 2 weeks. The Navy selected Batwing for the Speed to the Fleet process—a program designed to demonstrate new capabilities in fleet units. One year later, the first 3D-printed production articles were ready for installation

in fleet jets. The Speed to the Fleet instruction outlines the Navy's desire to allow operational units to develop concepts of employment and provide evaluations of new systems.

In Naval Aviation, those normally are roles for the Naval Air Warfare Development Center and the Air Test and Evaluation Squadron. Both organizations expressed concern that a fleet squadron might lack the expertise and capacity to evaluate Batwing. The pace of Speed to the Fleet accepted risk that the product might malfunction or that operators might fail to employ them optimally without vetted tactics.

VAQ-138 and VAQ-135 received Batwing antennae from the initial production run. During consecutive Red Flag exercises, the squadrons had opportunities to evaluate the antennae against trained adversaries in scenarios that mimicked deployed combat operations. The program moved so quickly that the developmental test report was still in draft; there was little data available about Batwing's specific capabilities and limitations. A personal connection between VAQ-138 and the developmental



The EA-18G Growler is the world's only tactical electronic attack aircraft. Growlers can locate and jam enemy ships, aircraft, radars and communications, as well as fire air-to-surface and air-to-air missiles.

Photo by LCDR Richard Rosenbusch, USN

testers allowed the squadron to review some test data before its official release. That data was critical to maximizing Batwing's performance and improving the value of data gathered at Red Flag.

VAQ-135 had a test pilot and a former operational test director on staff, but VAQ-138 had no aircrew with test experience. To aid in gathering data, the squadron invited a team of operational testers to fly during Red Flag. The Growler weapons schools were unable to send aircrew; however, tactics instructors worked remotely with the squadrons to develop rough guidelines for tactical employment.

The coordinated effort yielded tremendous success. Both squadrons performed well at their exercises, and Batwing was a key contributor. Employment by fleet squadrons in challenging scenarios validated bench testing and allayed fears that the increased power might overheat some components. It also showed the antennae were effective and suitable for combat while building confidence among the same fleet aviators and maintainers expected to deploy with them. Had the Batwings gone to the test squadron or weapons schools vice operational squadrons, neither would have had the opportunity to immediately test them under the same realistic conditions. The combination of pushing Batwing directly to VAQ-135 and VAQ-138 while enlisting the support of testers and tactics developers proved the fastest means of pushing combat capability into deploying squadrons.

Long-Range Anti-Ship Missile

The Navy designed Speed to the Fleet to push relatively simple or mature capabilities like Batwing into operational

units. In contrast, a Joint Urgent Operational Needs Statement is a way for Combatant Commanders to express an immediate need for capabilities that might still require extensive research and development. That was the case for Long-Range Anti-Ship Missile (LRASM), which emerged from a critical gap in America's ability to attack China's high-end surface ships. Developed by the Defense Advanced Research Projects Agency, LRASM is a quantum leap in technology when compared to the Navy's legacy Harpoon missiles. The missile features the ability to intelligently locate targets, maneuver around threats, and evade advanced surface-to-air missiles systems.

To fire LRASM at safe distances from threat warships, the launching platform requires an initial cue to the target ship. The only platform currently programmed to pass that data is the Growler. Declaring LRASM ready for combat required validating the ability for the Growler to send a cue to a B-1B Lancer bomber carrying LRASM. What initially seemed a simple task proved technically and logistically complex. As the program neared the final test, it had never successfully sent and received targeting using the software currently employed in fleet aircraft.

VAQ-138 supported the test while deployed to the Pacific, aided by VAQ-141 aboard the aircraft carrier USS *Ronald Reagan*. The squadrons needed to gather data about the technical challenges and form a solution. The greatest hurdle was identifying all the experts across Navy and Air Force test squadrons, contractors and intelligence sources. Each had a piece of the puzzle, but no organization had assembled them into a coherent whole. Once armed with technical data and recommendations from the testers, VAQ-138 developed and demonstrated a process for passing a cue to LRASM.

Not only was it the first successful test for LRASM, it was a groundbreaking process for translating national intelligence into tactical targeting. Tactics instructors at Air Force and Navy weapons schools packaged that process into fleet training, completing a major milestone that allowed LRASM to achieve early operational capability.

A Repeatable Process

Accelerating Batwing and LRASM acquisition required completing testing and tactics development using fleet resources. Over the year that VAQ-138 supported acquisitions, the squadron completed a pre-deployment training cycle, six major large-force exercises, a 6-month Global Reaction Force rotation, and the first 4 months of a deployment. VAQ-138 had no aircrew with test experience and only two Growler Tactics Instructors. There was credible risk that the squadron lacked the capacity and expertise to complete its operational tasks while supporting acquisitions. Success required building partnerships between organizations to share information and skills. Building those teams and gathering information from multiple organizations was the most time-consuming task for VAQ-138.

Building a repeatable process requires a framework for supporting evaluation in fleet units. The DoD must create a process for packaging testing and tactics development data and personnel with the technology it is pushing into operational units. Administrative commands must shepherd the process and facilitate communication between disciplines. This is particularly important when working across warfare domains, where personal relationships and common mental models are less likely to ease ad hoc collaboration.

The need for rapid acquisition will not subside, nor will the inherent risk of that speed. VAQ-138 formed partnerships that reduced the risk, and the results are clear. The Batwing and LRASM efforts proved that testing, tactics development and integration into deployable units can occur simultaneously. Partnerships across the acquisition, tactics development and operational communities facilitate rapid deployment of urgently needed combat capabilities.

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The Heart of Weapon Systems Availability

James Davis ■ William F. Conroy III

TO START WITH AND TO KEEP THINGS SIMPLE, WE'LL DEFINE AVAILABILITY AS A MEASURE of a weapon system's readiness to perform its mission. In terms of aircraft readiness, a metric often used for availability is mission-capable (MC) rate.

It is important to understand that three basic elements drive a weapon system's availability.

These are reliability, maintainability and supportability (RMS). We like to make the analogy that availability is akin to wins in baseball. In other words, it is the desired result and not the function. Continuing the baseball comparison, reliability would equate to hitting, maintainability to pitching, and supportability to fielding. Baseball fans would agree that all three components are important to winning, and the same can be said for the relationship of RMS to availability.

Let's stay with baseball for a bit and pretend we are the owners of a brand new baseball team. Our goal is pretty simple—win baseball games. Well, first we could go out and buy hitting. There are certainly


Davis has been assigned to Defense Acquisition University (DAU) as Department Chair for Logistics in the Mid-Atlantic Region for more than 7 years. He earlier was the Commanding Officer of the Navy Supply Corps School and served in various capacities such as Comptroller, Community Manager and Senior Assignment Detailer. **Conroy** has been assigned since 2005 to the DAU Mid-Atlantic Region as Professor of Life Cycle Logistics, and of Production, Quality and Manufacturing.

great hitters out in the market and buying some sluggers to drive in runs sounds like a great way to improve our chances at winning games. Next, we could buy some pitching to help decrease the number of runs scored against us ... again with our end result in mind—win baseball games. Finally, we would need to address the area of defense and go out to buy some solid fielders, again, to reduce the number of runs scored against us and ultimately help us win more games.

So, this baseball business is pretty simple. Buy hitting, pitching and fielding abilities and you win ball games. But what if the hitters you purchased don't perform as expected? Rather than drive in 100 runs in a season, your star

portability and specifically, we tend to look at the supply support element of the product support package. How many times have we heard "If we only had more spares"? And sometimes that's true. We might not have enough spares (or for our baseball analogy, enough good fielders). But the fact is, changing the number of spares will not change the reliability of the system, and we will most likely still come up short in our availability.

So, if we're saying the problem is reliability, then why don't we fix the reliability? For clarification purposes, we are not saying the shortfall in availability of your weapon system is due to less than planned reliability. What we are saying is that in order to fix a shortfall in your availability, you must



**...When we face an availability shortfall,
we need to look at all three
fundamental components of availability
(RMS) and then take the most practical
steps to resolve the shortfall.**

slugger falters to 50 runs batted in. Do you win as many games? Probably not. I say probably not, because we operate in a real-world environment so there would be some level of deviation. But, ultimately, we wouldn't be surprised by a losing season.

OK, so a pretty miserable first season has come to a close, and now it's the off season. We have some decisions to make. We can either stay the way we are (with probably the same miserable outcome); we can go out and get new hitters who have shown more promise; or we can make adjustments to our pitching and fielding. Now, there may be some adjustments we need to make to our pitching and fielding, but the one thing we do know is that our hitting isn't meeting our needs. So what do we do? We get rid of our poor hitters and replace them with better hitters. Assuming our pitching and fielding continue to serve us well, we should be set for a great upcoming season.

It sounds pretty easy—right? The same analogy can be applied to the availability of our weapons systems. In other words, if our issue with weapon system availability is the reliability of the components, then why don't we improve the reliability? Instead, we have a tendency to look at only the "nondesign" component of availability—namely, sup-

portability and specifically, we tend to look at the supply support element of the product support package. How many times have we heard "If we only had more spares"? And sometimes that's true. We might not have enough spares (or for our baseball analogy, enough good fielders). But the fact is, changing the number of spares will not change the reliability of the system, and we will most likely still come up short in our availability.

We must also understand the impact reliability plays on supportability. Reliability has one of the greatest influences on the development of the product support strategy and thereby the product support elements that we procure in support of the weapon system availability. Component failure rates drive our provisioning process, level of repair decisions, technical data procurement, etc. To put it in more basic terms, we understand that during the provisioning process, failure rates will determine if we even assign a national stock number to an item. If an item isn't expected to fail, there is no need to go past a part number assignment. However, if that item does fail, then you are a long way from obtaining a new spare. The same logic applies for the level of repair. If an item is expected to be highly reliable, then the level of repair analysis and subsequent supply, maintenance and recoverability (code recommendation will be for two levels of repair rather than establishment of a third level of repair (intermediate level capability). Again, if the failure rates fall short of prediction, we will run into availability challenges.

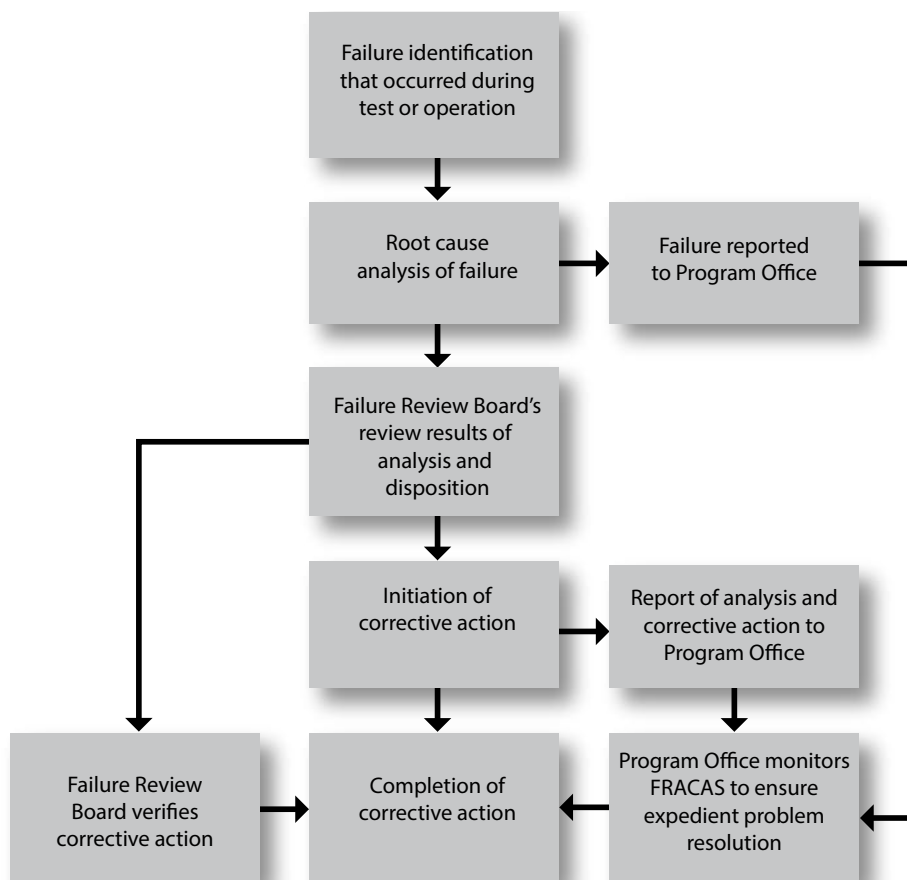
Nothing said so far should come as a revelation. It's a pretty basic model and we readily admit that there are a myriad of other factors that drive a weapon system's availability (OPTEMPO [operations tempo], environment, age, etc.). The point we want to drive home is that when we face an availability shortfall, we need to look at all three fundamental components of availability (RMS) and then take the most practical steps to resolve the shortfall. Notice that we didn't say we need to fix the component that exhibits the shortfall. For instance, it might be impractical to "fix" a reliability shortfall. We might not be able to improve the reliability of the design and will just have to live with the "new normal" of the failure rate. However, we then have to return to our supportability analysis process and refresh our input data in order to reevaluate the product support strategy and subsequent Integrated Product Support element investments required to meet our availability needs. This sounds simple enough, but unfortunately, there is a tendency to just buy more spares and try to solve the availability shortfall without the analysis. Buying more spares could help. Although, we would be a procurement lead-time away from having the new spares and would certainly not be optimizing your product support package.

Figuring on FRACAS

Talk about a cool acronym—FRACAS, for Failure Reporting Analysis and Corrective Action System. Not only is its acronym cool, it is also a fantastic system in helping to resolve availability shortfalls. Unfortunately, there are many folks out there who have never heard of FRACAS—and that is because their program doesn't employ a FRACAS.

First, let's start with some background about FRACAS. It has its roots with the U.S. Navy and specifically with the Naval Air Systems Command (NAVAIR). The concept developed into Military Standard (MIL-STD)-2155 dated July 24, 1985, and was made available for use by all departments and agencies of the Department of Defense. MIL-STD-2155 transitioned to Military Handbook (MIL-HDBK)-2155 in 1995. There was no change to the narrative, just that the information was now guidance and not directive. As noted in the MIL-HDBK, FRACAS is a disci-

Figure 1. A Basic FRACAS Procedure



plined and aggressive system and is considered an essential element in the early and sustained achievement of both reliability and maintainability (Figure 1).

MIL-HDBK-2155 emphasizes a couple of key points: (1) FRACAS needs to be a disciplined system and include the life cycle's sustainment period and (2) the program must take action to correct the root cause of the failure.

Let's break that down further:

Disciplined System

MIL-HDBK-2155 defines FRACAS as a disciplined and aggressive closed loop Failure Reporting, Analysis and Corrective Action System that is considered an essential element in the early and sustained achievement of the reliability and maintainability potential inherent in military systems. From this definition, we can focus on a couple of key words. FRACAS is disciplined and aggressive. In other words, we need to have a well-defined process by which we are capturing the failures and investigating the failure data and providing recommended corrective action. We also must have a robust process that is expedient and

doesn't measure the response time in years. Speed is a virtue and extremely important to taking the corrective actions and achieving the desired weapon system availability throughout the life cycle.

Taking Action on the Data

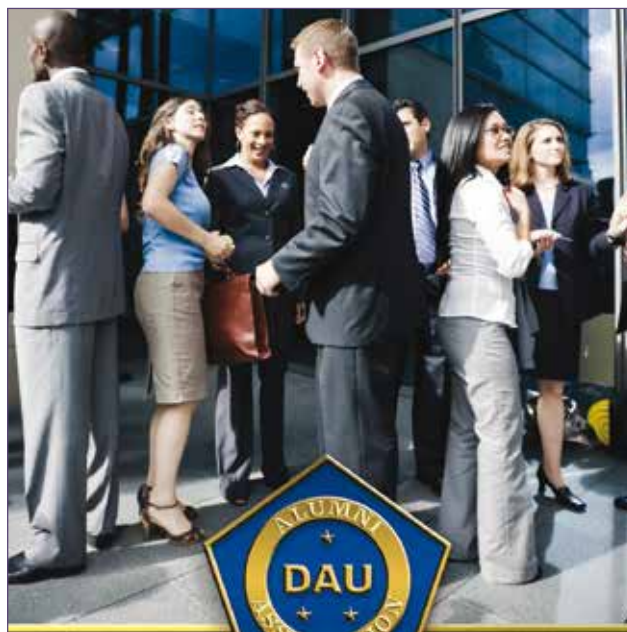
FRACAS is a closed-loop system that not only captures the failure data, but then also generates corrective action on the failure data. The effectiveness of the FRACAS is predicated on the level of accuracy and thoroughness of the failure data. More specifically, the data should reveal who discovered the failure, what failed, where it failed, when it failed and how future failures could be prevented. This is easier said than done as a great deal of effort is needed on collecting and analyzing data to even start recommending corrective actions. Sometimes we are lucky and the recommendation can be as simple as a change in procedures, or it might involve correcting an earlier design change. We can recall one time when a reliability engineering change added a grounding strap to a power supply. The grounding strap significantly improved the reliability of the units. Unfortunately, we still experienced failures. Upon analyzing the data, we determined that only the first 25 units still were failing. As it turned out, the engineering change only addressed units 26 and higher. The first 25 were inadvertently left off the change. Data were collected, analysis performed and corrective action (place grounding straps on first 25 units) taken. Sometimes it can be that simple.

Summary and Conclusion

We readily admit that there are limitations in developing a robust FRACAS. It's one thing to sit behind a desk and write about all the things we should be doing. It's another thing to be out there doing them and dealing with the speed and intensity of operations and the intense competition for resources, time, money and manpower.

What we suggest is to take a moment to step back and capture the root cause issues and not just try to treat the symptoms. Yes, it's hard. If we have a hole in an aircraft, the immediate reaction is to get a new spare to fill the hole and maybe look at ways to make the depot more efficient to providing those spares. But, in relation to the baseball analogy introduced earlier, wouldn't it be nice if we also went after the underlying causes to our availability shortfalls and did the analysis on the three components of reliability (hitting), maintainability (pitching) and supportability (fielding) and then adjusted our product support strategy (roster) accordingly? We need to appreciate that the answer to our availability might not be to buy more spare parts or fix repairable parts faster ... the problem just might be a little more complex than that.

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Simulations Vs. Case Studies

Not “What Happened?” But “What If?”

Eugene A. Razzetti

FIRST IN A THREE-PART SERIES

IN THE NAVY, WE USED TO SAY THAT THERE ARE THREE TYPES OF OFFICERS: THOSE WHO MAKE things happen, those who watch things happen and those who say, “What happened?”

We can no longer afford “Number 3.” We must support those who make things happen and give the right analytical tools to those assigned to watch things happen; so that everybody knows “what happened.”

In 2017, I wrote an article for *Defense AT&L* magazine titled “Tabletop Exercises—An Affordable ‘Value-Add’ in the Acquisition Process,” in which I recommended using tabletop exercises when wargames are too hard to develop, fund or schedule. In this current article, I suggest not only that the tabletop is superior to the case study, but that, by applying basic risk, probability and gaming simulation, developers can create a meaningful tabletop or wargame where only a case study previously existed. Unlike the “here it is, read it” structure of the case study, tabletops and wargames are iterative processes, wherein the players work through timely scenarios.

Razzetti, a retired U.S. Navy captain, is a management consultant, auditor, and military analyst, and a frequent contributor to both *Defense Acquisition* and the former *Defense AT&L* magazines. He is the author of five management books, including *Hardening By Auditing—A Handbook for Measurably and Immediately Improving the Security Management of Any Organization*, and he has served on the advisory boards of two business schools.



The dynamic structure of the simulations helps the players not only to arrive at (hopefully correct) decisions, but to work through decision processes and learn about the effects of those decisions.

Unlike stand-alone case studies, simulations come to life by providing the following:

- An actual, iterative sequence of events
- Player participation in the play of the game
- Immediate (albeit artificial) feedback
- Critical analyses, versus simple data review
- New theories for testing—and their implications
- An early appreciation for the fog of war

Since our college days at least, we have worked with case studies. What Business Administration student could ever forget the Acme Widget Company? Case studies were a great way for inexperienced kids in classrooms to stretch their new brain muscles around problems long past but often repeated. These days, there is only limited value to gaining proficiency with what already happened. We need to go further. Certainly, we need to learn from the past, but

we need to take away what is important and apply it optimally to challenges yet to come—and do so quickly.

The Department of Defense (DoD) should take whatever worthwhile case study and 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.

Defining Terms

A **case study** is a process or record of research in which detailed consideration is given to developing a particular person, group or situation over a period of time—or a particular instance of something used or analyzed in order to illustrate a thesis or principle. The problem with case studies is that often they (at best) stop short of providing a productive mental exercise, or (at worst) leave users with unproven and likely erroneous root causes and conclusions—already arrived at. Data collected from case studies can provide a starting place and (perhaps) a working hypothesis for simulations, and, possibly tabletops and wargames.

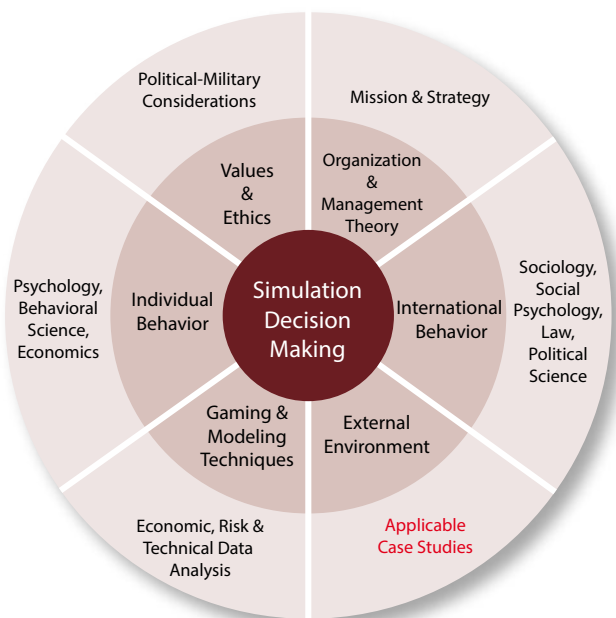
A **simulation** is an imitation of a situation or process, or the action of pretending; deception, or the production of a computer model of something, especially for the purpose of study, analysis and prediction. Many of the criticisms directed at military simulations result from an incorrect application of them as a predictive and analytical tool. Basic simulations tend to produce three sets of results: a best, intermediate and worst-case outcome. It is not my intention here to bury the reader in algorithms and formulae, linear programming, Monte Carlo or the theory of games. The best approach is the one that gets actionable answers without scaring away the participants. We'll stay at a 50,000 feet elevation for now.

Outcomes supplied by models rely on human interpretation and therefore should not be regarded as providing "gospel truth."

In a **tabletop exercise** key personnel who are assigned high-level roles and responsibilities are brought together to deliberate various simulated emergency or rapid response situations. Tabletop exercises (conducted in conference rooms) are often the first opportunity that participants from different commands have to meet and gain appreciation for each other's capabilities and shortcomings.

A **wargame** is a type of warfare modeling, including simulation, campaign and systems analysis, and military exercises; and a simulated battle or campaign to test military

Figure 1. Using Case Studies in Simulation Decision Making



Figures and table by the author.

concepts and uses. Wargames normally are conducted in dedicated facilities with officers acting as opposing staffs; and with actual force members participating. And the games are refereed by umpires.

Each of the four activities as defined has, to varying degrees: objectives, a scenario, and data. That much is basic, and you need it to be informed. However, to analyze and predict, you also need models, rules and players. And analysts. Like umpires, analysts are vital. Analyze the past and predict the future—or else don't waste your time.

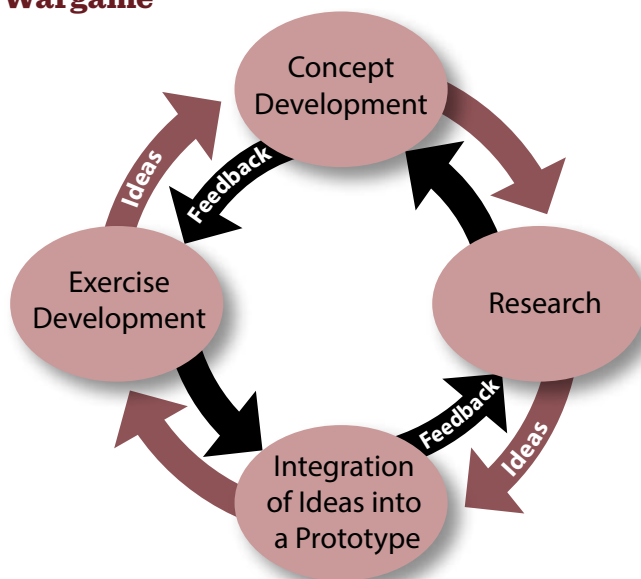
Figure 1 describes where the case study fits in dynamic, predictive modeling and simulation. It reminds the reader that the case study, however informative, is a "done deal" unless and until it becomes part of a greater enterprise.

Figure 2, from my previous article, describes the dynamic nature of a process worthy of the time spent on it. A case study would appear in the "Research" bubble as essentially a finished product—informative but inert. Simulation begins in the Integration bubble. The constant churning of ideas (clockwise arrows) and feedback (counterclockwise arrows) takes developers well past case studies and into tabletops or wargames.

Political-Military Simulations (Exciting Stuff)

Military simulations (wargames) are models in which theories of warfare can be tested and refined without the need for actual hostilities. They exist in many different forms, with varying degrees of realism. In recent times, their scope has widened to include not only military but also

Figure 2. Developing a Tabletop or Wargame





Analyze the past and predict the future— or else don't waste your time.

political and social factors. Political-military simulations remain widely used today. Often, modern simulations are concerned not with a potential war between superpowers but more with international cooperation, the rise of global terrorism and smaller brushfire conflicts such as those in Kosovo, Bosnia, Sierra Leone and Sudan.

For years, there have been many charges that computerized models are unrealistic and slanted toward particular outcomes. Critics point to the case of military contractors seeking to sell a weapons system. For obvious reasons of cost, weapons systems are extensively computer modeled. Without testing of its own, the DoD may need to rely largely on the manufacturer's own models configured to show weapons systems under ideal conditions, with actual operational effectiveness turning out to be less than stated.

Human error is another factor that can render a model/simulation invalid. A programming error (a guided missile cruiser consistently steaming at 70 knots) can produce outrageously incorrect outcomes. Human factors, such as training, expertise and morale frequently lead to programming snags and complications.

Available intelligence (or the lack thereof) brings its own set of snags and complications. Modelers simply may not know accurately the capabilities of opposing forces.

Ideally, political-military simulations should be as realistic as possible—that is, so designed as to provide measurable, repeatable results that can be confirmed by observation of real-world events. This is especially true for simulations that are random in nature (called “stochastic”), as they are used in a manner that is intended to produce useful, predictive outcomes. Any user of simulations must always bear in mind that the simulations are, however, only an approximation of reality and, hence, only as accurate as the model itself.

Disaster preparedness simulation can replicate emergency situations, train first responders, and develop concepts of operation. Disaster preparedness simulation can involve

training on how to handle terrorist attacks, natural disasters such as hurricanes, pandemic outbreaks or other life-threatening emergencies.

Management Simulations

Even short of simulating combat situations, (i.e., in actual tabletops and wargames) simulation has contributions to offer in Finance, Project Management, Training, Risk Analysis and Management, Needs Analysis, Supply Chain Management, and general decision making. Basically, any tasks requiring:

- Evaluation of strategies and core values
- Life-cycle product or system management
- Identification and evaluation of alternative approaches
- Analysis and quantification of strategies, goals and objectives
- Database development and data analysis
- Identifying potential synergies and innovations
- Metrics and measures of effectiveness
- Assignment responsibilities
- Performance-based contract administration
- Actionable courses of corrective action.

Project management simulation, for example, is often used for present and future project managers in the private sector. In some cases, simulations are used for “what-if” analyses and for supporting decision making in real projects. The simulation often is conducted using specific software. It also often is used to analyze and evaluate planned and existing projects. The goal of the simulation is to show the user the different possible outcomes of his or her decisions, along with the probability of each outcome. Simulation helps in reducing the project risk and in choosing the optimal approach. In a typical simulation, the project is first modeled with a software tool and use of uncertain variables. A simulation then is run to check the different possible outcomes and their probability as a result of different inputs for the uncertain variables.

The use of simulation throughout a product's life cycle, especially at the earlier concept and design stages, offers possible benefits, ranging from direct cost reductions as

in reduced prototyping and shorter time to service use and better performing products with longer service lives.

Continuous Improvement

Every modern management program, regardless of purpose or focus, must be executed with a continuous improvement mindset; and simulations provide managers with sneak peeks into continuous improvement innovations and opportunities. If a model does not add value and include continuous improvement, it's not ready for use.

Unlike when dealing with opposing forces, modelers of management-related simulations will likely possess robust data and a high degree of situational awareness—making their validity and contribution greater.

Validation

In the development of simulations, validation is the process of testing a model by supplying it with historical data and comparing its output with the known historical result. If a model can reliably reproduce known results, it is considered to be validated and assumed to be capable of providing predictive outputs within a reasonable degree of uncertainty.

Figure 3. Progressively Gaining Robustness, Payback and “Value-Add” Through Simulation

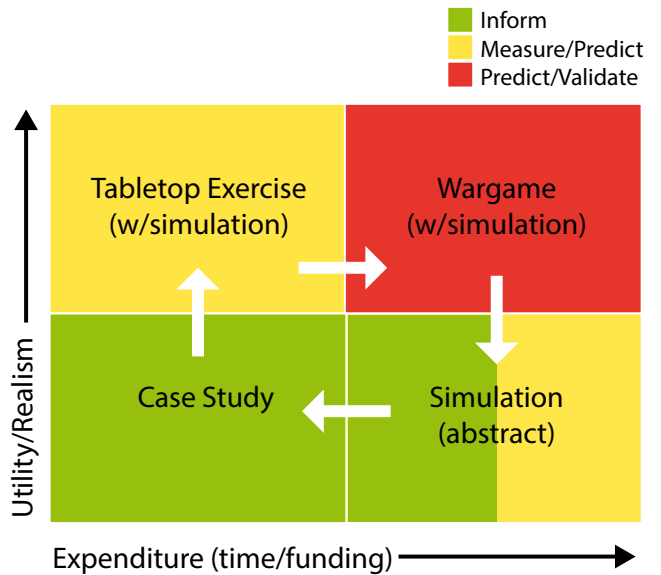


Table 1. Specific Areas for Improvement Through Simulation

Areas for Improvement	Case Study	Simulation/Modeling	Tabletop *	Wargame *
Program Management	Green	Green	Yellow	Red
Strategy/Concept Development	Green	Green	Yellow	Red
Disaster Preparedness	Green	Green	Yellow	Red
Doctrine/Checklist Development	Green	Green	Yellow	Red
Develop/Model Performance Metrics/Measures of Effectiveness	Green	Green	Yellow	Red
Pre-/Post-Incident Evaluation and “Hot Washup”	Green	Yellow	Yellow	Red
Conclusions, Action Plans, Milestones, Assignment of Responsibilities, and Feedback	Green	Green	Yellow	Red
Computer-modeled Simulations	Green	Yellow	Yellow	Red
Needs Assessment	Green	Green	Yellow	Red
Threat/Risk Assessment	Green	Yellow	Yellow	Red
Connectivity, Command and Control	Green	Green	Yellow	Red
Decision Development	Green	Green	Yellow	Red
Preliminary Validation of Operations and Tactics	Green	Green	Yellow	Red
Actual Elements of Armed Forces Participating	Green	Green	Yellow	Red
Two-sided, Opposing, Umpired Maneuver	Green	Green	Yellow	Red

*Including simulations



DoD needs to embrace simulation not only for realistic warfare planning and training but for responsive project management.

Progressively Gaining Robustness, Payback and “Value Add”

The payback from each of the four approaches described (case study, simulation, tabletop and wargame), like the approaches themselves, directly reflects the level of preparation and execution. Figure 3 and Table 1 demonstrate how progressing from stand-alone case studies, through wargames by the accelerated employment of simulation, takes developers from information of the past to prediction of the future, with attendant increases in utility, comprehensiveness and realism.

Planners and project managers need more than historic information and anecdotal evidence. They need the capability to subject that information to critical analysis, while all the time honing their own analytical skills and professional competence. They need to develop actionable findings and predictions, and to validate them.

Table 1, in applying Figure 3, describes how developers can predict and validate their concepts by increasing the robustness of the effort.

Start with the column marked “Areas for Improvement” which lists the focus areas (feel free to put in your own). Then do the following:

- Apply mission-centric goals and objectives.
- Gather available, useful data.
- Determine what needs to be verified and validated, looking always for areas of potential synergy and innovation.
- Consider the entire life cycle of involved systems and equipment, including training simulators.
- Develop tentative conclusions for testing.

And then:

- Develop models and simulations.
- Work them in realistic scenarios with all positions filled by experts.
- Develop and/or identify decision points.
- Identify actionable intelligence for realistic prediction and decision making.
- Develop feedback loops.

You have now developed the foundation for (at least) a comprehensive tabletop or (at best) a comprehensive wargame.

Summary

Decision making in DoD requires simulations, tabletops and wargames; they must be structured to allow players to make decisions and to measure and predict the impacts of those decisions. DoD needs to embrace simulation not only for realistic warfare planning and training but for responsive project management.

In the classroom, simulations can become a “living” textbook addressing challenges in the present and creating/recreating the curriculum of the future and a vital and indispensable part of the DoD acquisition processes.

In the game room, simulations scrutinize ideas and theories, assessing and predicting outcomes with minimal time and funding requirements with the goals of preserving life and fulfilling the mission.

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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 managers.

Navy/Marine Corps

CAPT Todd M. Evans relieved **CAPT Craig D. Grubb** as program manager for the MH-60R/S Multi-Mission Helicopter Program (PMA 299) on Dec. 20, 2018.



Avoiding the Death Spiral

Carlton White

WORKFORCE MILLENNIALS BORN FROM THE EARLY 1980S UNTIL THE LATE 1990S AND BABY Boomers born between the mid-1950s and 1960 have endured bouts of bad resource management, and in some cases this has transitioned into the Army Program Offices management of procurement funds. So how exactly can we right the ship when it comes to the Defense Acquisition System (DAS) and meet Office of the Secretary of Defense (OSD) Goals for obligation of procurement funds? Honesty in resource management by avoiding the resource “death spiral” is a start.

One of the goals of sound resource management practice is to spend in a timely manner the money appropriated by Congress for national defense. To encourage that outcome, the OSD has established historically based benchmarks for the percentage of available funds that should be executed by the end of the fiscal years of the appropriation. The execution of the funds is key not only to the resources a program office receives in the budget year but also in the program objective memorandum (POM) for future years. The focus on procurement funds is key due to more than 50 percent of Army program offices receiving these kinds of funds. And with the 3-year window to obligate, with an 80 percent obligation required by the end of the first year of appropriation, it’s important to discuss the proper means to either obligate or reprogram resources. The example of the Light Engineering Utility Trailer (LEUT) highlights the issue of obligating procurement

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funds within OSD benchmarks and how through proper assessment, planning and focusing on use of resources helped the LEUT program escape the “death spiral.”

The death spiral is the year-over-year under execution of resources appropriated by Congress. How do we avoid the death spiral? Simply put, give money back you can't execute and plan your future year funding according to what you can execute and not your previous budget. How can your organization escape the death spiral? Those new to their program offices prior to midyear should consider planning to reprogram funds toward another requirement in their program portfolios or simply give up the funding to the next higher organizational levels. Also, determine how to properly execute future appropriated funds and how your reprogramming recommendation will support requirements of other programs.

Budget and Execution

As part of the Defense Department's annual planning, programming, budget and execution (PPBE) development process, OSD reviews historical performance against

the established benchmarks. Since Budget Estimates are submitted annually, their funding requests every fiscal year are submitted in advance of funds becoming available. This gives program managers (PMs) an opportunity to assess program schedules and change their funding requests prior to the beginning of a budget year and thereby possibly avoid under-executing their funding.

With all of this time provided, why is it so difficult to execute these funds as a PM? Some have argued that the need to obligate funding to avoid reduction in POM and budget year funding is a problem, not an OSD failure to execute funds. However, due to contracting and legal requirements, often these benchmarks are missed and PMs hold resources, thereby triggering the death spiral. To avoid this, PMs have done issue papers or avoided awarding contracts and transferring interdepartmental resources to depots to pay for completion of required work. Is the real answer to push the requirement off on depots? Sometime this is the perfect solution. But it risks missing out on technology advancements by outsourcing to contractors. But overall, the real key to executing these funds is for PMs to assess their

How was it possible to make such a drastic change from being in the proverbial death spiral of constantly under executing funds to now accepting a reduction in current funds and having a tangible plan to execute remaining funds?

current programs and determine “honest” goals for when they can execute funds and in what fiscal years, and giving up current resources to preserve future (POM) resources.

Light Engineer Utility Trailer

An example of the honest goals approach is the LEUT program under the Light Tactical Vehicle (LTV) portfolio. The LEUT is a non-developmental trailer designed to provide dedicated support transport of small construction equipment filling current and future capability gaps in the Combat Engineer Fleet. Its lunette will allow it to be towed by the modified (authorized) dump trucks that currently have no trailer.

Procurement funds were requested for Fiscal Year (FY) 2017, FY 2018 and FY 2019 funds to buy test assets, develop logistics products, and perform Low Rate initial Production (LRIP) for Type I and Type II LEUT. As of December 2018, no FY 2017 funds were obligated, and only 27 percent of FY 2018 funds obligated were missing OSD goals for the last 2 years. The goals were missed due to an update to the Capability Production Document that delayed release of the Request for Proposal. Finally, the House Appropriations Committee-Defense decided to reduce the LEUT FY 2019 budget from \$16.5 million to \$2.8 million. An appeal was formulated to retain \$7.5 million of the \$16.5 million based on the amount of money that could be executed in accordance with OSD goals (i.e., keeping us out of further under-execution and exiting the death spiral). Table 1 shows how the LEUT program historically had under-performed and not met the 80 percent obligation rate within the first year of funding but, through honesty in money management, made adjustments to escape the proverbial death spiral.

Given this, the product director decided to complete an Issue Paper proposing a reduction from \$16.512 million to \$8.85 million with a plan to execute 100 percent of the resources in FY 2019 exceeding OSD goals for FY 2019

funding. In addition, the product director has generated a plan to execute 100 percent of FY 2017 and FY 2018 funds by the end of FY 2019, to meet the 3-year OSD goal (as shown above).

This resulted in the reprogramming of resources toward other programs that had unfunded request (UFR) and funding shortages to meet their program requirements and support funding goals for their organizations. In addition, it created a schedule with resources and personnel to support the goal of meeting OSD benchmarks, properly supporting program requirements, and keeping industry in business to support current and future requirements.

How was it possible to make such a drastic change from being in the proverbial death spiral of constantly under executing funds to now accepting a reduction in current funds and having a tangible plan to execute remaining funds? This is where the honest factor makes clear and concise assessment of programs, assessing what current resources have been based on program growth, and assessing the proper resources needed for future growth prior to requesting resources.

The “Honest” Factor

So how are clear, concise assessments of current and estimated required resources made for a program office? The process starts with assessing how resources have previously been used in the office and developing a clear vision of how current and future proceeds will be used going for-

Table 1. Correction of Performance Failures

FY 17 Funds	FY 17	FY 18	FY 19
	Missed OSD goal	Missed OSD goal	Missed OSD goal
FY 18 Funds	FY 18	FY 19	FY 20
	Missed OSD goal	Missed OSD goal	Plan to meet OSD goal
FY 19 Funds	FY 19	FY 20	FY 21
	Missed OSD goal	Plan to meet OSD goal	
FY 20 Funds	FY 20	FY 21	FY 22
	Plan to meet OSD goal		

OSD = Office of the Secretary of Defense

Table by the author.

ward. If a program office has continuously under-executed it may help to take a reduction in appropriated resources to meet OSD benchmarks and show that resources can be managed properly to achieve program success. There also is the benefit of not having POM year resources decremented and the opportunity to prepare procurement packages and award contracts to avoid falling back into the under obligation death spiral. Either way, the first step is to assess the program's history and present status, create a clear vision and goals for a revised present and future, and execute in the new fashion to achieve that vision.

In addition to the assessment, vision and goals for a program office, cost, performance, schedule and risk should be considered within the assessment. The primary means of moving out and staying out of the death spiral is to assess schedule first and foremost, and determine what increases and decreases the schedule. With a firm understanding of what kind of resource allocations will allow the spending of resources within OSD-allotted benchmarks, PMs will be better able to manage current and future resources. Once the schedule is established, it is essential to focus on performance per the purchase description and

the cost of meeting the required performance. This will support future budget needs after using the contractor, depot or public-private partnership to support mission requirements. Risk should be mitigated throughout schedule, performance and cost to assure no slippages, overruns or receipt of under qualified products.

Conclusion

Let's not let Army leadership or Congress make the decision for program offices to redirect funds through night court or funding reviews. Rather, let's assess programs early and often with reasonable means to meet OSD goals for executing funding. In turn, let's be sure not to give up all funding but only the proper or unavoidable and necessary amount so that we keep our depots and contractors in business to support current and future requirements. How do we do this? By making honest assessments of our programs and delivering a clear and concise message that we will request what we can execute and need, and not over- or under-request funding, so we can continue to meet program office requirements in the near and long term.

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ELECTRICITY SPIKES and the **Power of Collaboration**

Anthony Gannon, Ph.D. ■ Eva Regnier, Ph.D. ■ Douglass Taber

LIKE MANY DEPARTMENT OF NAVY INSTALLATIONS, NAVAL SUPPORT ACTIVITY MONTEREY (NSAM) faces power bills that can change dramatically due to short spikes in electricity demand. Unlike most Navy installations, NSAM hosts an academic institution—the Naval Postgraduate School (NPS), where students and faculty can work closely with Naval Facilities Engineering Command (NAVFAC). At NPS and NSAM, the connections built over years of collaborations formed through the Energy Systems and Technology Evaluation Program (ESTEP) research helped save 25 percent on power bills for one of the NPS labs.

Air-Compressor Billing Spike

Non-residential customers often pay not just for power consumed in kilowatt-hours (kWh), but also charges associated with short-duration demand spikes—kilowatts (kW) experienced in 15-minute periods. At NSAM, the Pacific Gas and Electric Company (PG&E) monthly bill includes a demand charge of \$20.22 per kW for the highest 15-minute electricity

Gannon is an associate professor in the Vavra Turbopropulsion Laboratory of the Graduate School of Engineering and Aerospace Engineering at the Naval Postgraduate School (NPS) in Monterey, California. He is a professional engineer and his research interests include turbomachinery, design, testing and renewable energy in defense contexts. Regnier is an associate professor at the NPS Graduate School of Business and Public Policy, where she studies and teaches analytic decision making. Taber is the recently retired installation energy manager for Naval Support Activity Monterey at NPS, where he collaborated closely with many students and faculty.

demand during the billing period if it occurs in the morning during summer, and up to \$35.35 per kW if it occurs later in the day. Rates vary by time of day and season, and change occasionally.

When peak demand at the TurboLab increased from about 200 kWh in July to more than 1600 kWh in August 2017, NSAM Energy Manager Douglass Taber took notice.

At the Vavra Turbopropulsion Laboratory, affectionately known as the “TurboLab” by the faculty, students and faculty design and test gas turbines. The Navy has more than 400 gas turbines in its ships and a similar number in its planes. The greater the turbines’ efficiency, the more capable is the fleet—and they must be extremely reliable to avoid accidents like the April fan blade failure on a Southwest Airlines jet that killed one passenger and nearly brought down the plane. TurboLab’s in-class demonstrations and experiments run gas turbines at supersonic speeds—the blade tips may be moving at over 900 miles per hour. Without this high-speed ability, tests would not be relevant to modern jet engines.

These tests require a huge volume of compressed air—10,000 cubic feet per minute (cfm) at 3 atmospheres pressure (atm), which is provided by a transonic compressor test rig, powered by a 1000-kW compressor. The system is very effective and reliable—it provides the large volumes of air required. But it is not efficient as it dates from the late 1960s, when power electronics required to regulate the speed simply were not available, and the compressor runs at a single speed. Excess air is simply bled off to the atmosphere, wasting the power used to compress it.

The 1000-kWh capacity is required for top-speed runs. However, top-speed runs are only a small portion of a typical test run program, which requires runs at speeds at 50 percent, 60 percent and so on up to 100 percent of capacity. In addition, lower-speed runs often are used to set up new instrumentation and rotors because the 100 percent speed runs have much higher chances of catastrophic rotor failure. The large majority of runs in a typical test use much more power than would be required if the compressor could be operated at lower speeds. Since the power requirement is proportional to the square of the test turbine speed, with a variable-speed compressor, a 50 percent speed run requires only 250 kW.

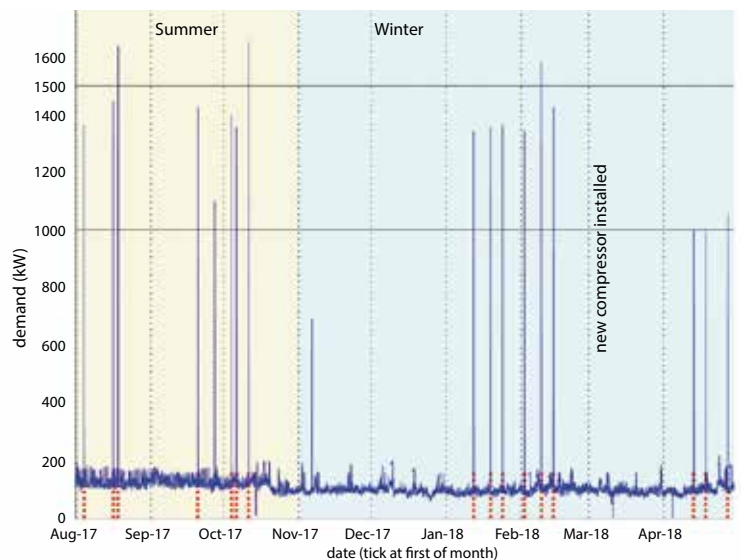
The test rig also includes a 500-kW compressor that provides secondary air at up to 10 atm to balance the rotor load and provide air to

bearing cooling systems. It also drives TurboLab’s supersonic wind-tunnel and the spin-pit test rig. This compressor was purchased in the 1980s and operates at only one speed, with excess air being bled off. Figure 1 shows the recent electricity demand at TurboLab—demand spikes on test dates.

TurboLab has been conducting its tests early in the day in order not to incur peak time-of-use charges, but Taber’s call regarding the \$44,000 bill in August—which would have been \$16,000 without the three tests—led Associate Professor Anthony Gannon to revisit the system requirements. His experience designing and building a small-scale compressed-air energy storage system for an ESTEP-funded compressed-air energy storage project gave him the technical knowledge to size and specify a more suitable compressor. Recent improvements to the test rig reduced the secondary air requirement, and a 55-kW variable-speed compressor was specified, and in March it replaced the 500-kW compressor. Both are shown in the photograph.

Since the installation of the smaller compressor for secondary air needs in March 2018, the system has performed flawlessly and its use is beginning in various other thesis projects in developing small air-driven turbines for backup power. As an added bonus, the operation of the new compressor is far simpler than the previous one and the time to start up to gather data is reduced by around 30 minutes per test. Figure 2 expands the power demand plot for two

Figure 1. TurboLab’s PG&E Power Demand



Note: The test rig was used on the dates shown with red lines. After the 500-kilowatt (kW) compressor was replaced with the 55-kW unit, peak demand during tests dropped about 500 kW.

Photos and figures by Naval Support Activity Monterey.



The old 500 kW compressor (left) was replaced with a 55-kW compressor (right).

tests, one (blue) that peaks at 1585 kW dates from before the installation of the new compressor. The second test date (orange) shows the change after the new compressor was installed, and peaks at 1058 kW.

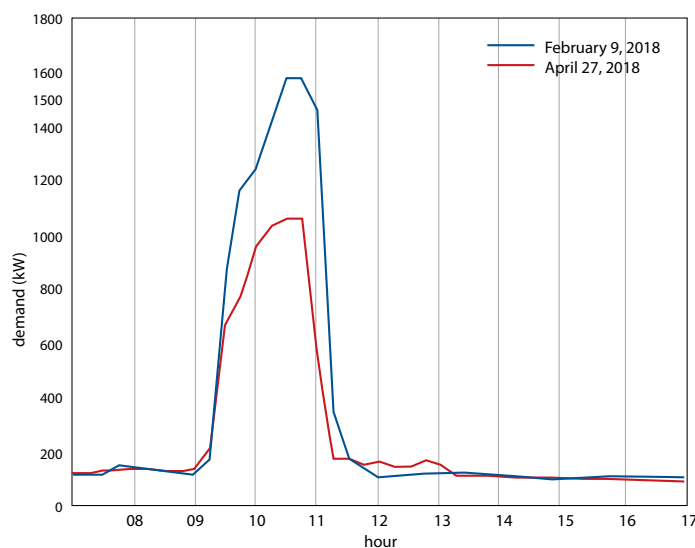
It was through experience with the ESTEP research and a compressed air energy storage project that Gannon's team had the technical knowledge to make the procurement of the smaller compressor so successful. Planning for the upgrading of the larger 1000-kW system is ongoing.

Costs and Savings

Meanwhile, a second ESTEP team from the NPS Graduate School of Business and Public Policy had been studying utility rate structures and how the time-profiles of power demand can drive up power bills. Figure 3 shows their analysis of the attribution of utility costs to supersonic tests.

The costs of 13 tests between August 2017 and February 2018 are estimated at between \$105,000 and \$113,000

Figure 2. Demand in 15-Minute Periods



Note: Figure shows tests before (blue) and after (orange) replacing the 500-kW compressor.

from demand charges, and only about \$2,000 from the actual power consumption (kWh). The costs were calculated relative to a baseline demand profile in which TurboLab used the average demand for the same month, day of week and hour, instead of the observed demand. During PG&E's summer billing months, a single test spiking to 1600 kW would cost more than \$28,000, relative to a baseline maximum demand of 200 kW, which we see for August and October 2017. In the winter, the same spike would cost more than \$21,000, which we see for the February tests. With the new test rig in April, the spikes decreased to about 1,000 kW, and the demand charge from the tests decreased to \$12,700, a savings of \$6,800.

Figure 1 shows that the peaks in Figure 3 are typical. Tests in April have power spikes to 1000 kW from the primary compressor, rather than to 1500 kW above the baseline power demand of about 150 kW. The cost per test is difficult to attribute since the first test in a month triggers a big demand charge. Once that big peak demand charge is incurred, additional tests in the same billing period have a much smaller marginal cost. However, reducing the peak demand by 500 kW saves more than \$10,000 in a summer billing month and \$7,600 in a winter billing month. The new equipment would recoup its \$72,000 cost in about 2 years with a similar test schedule.

Other benefits are excluded from the calculations above. The new compressor is easier to operate, and tests are shorter (as illustrated by the shorter orange spike Figure 3), saving labor hours. Using the smaller compressor also puts far less mechanical stress on the system, and reduces the frequency of other ancillary maintenance.

The S&T-NAVFAC Connection

Gannon knew of the high energy demands of the TurboLab, but, like most research tenants, is constrained by limited research money for changing the laboratory equipment. All tests are always completed before 12:00 noon, as there is an

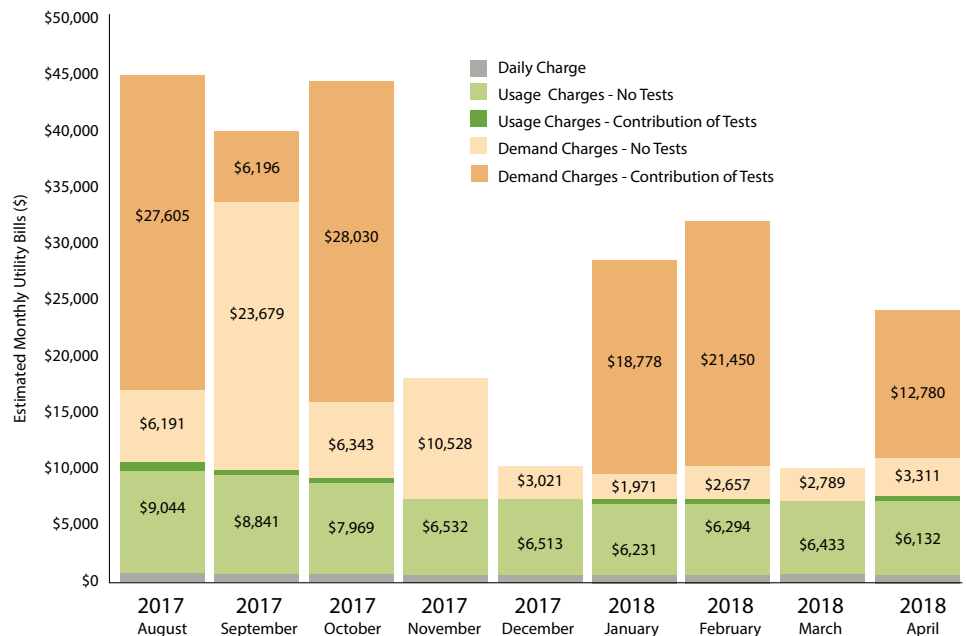
increase in the tariffs afterward, but this means that test programs are not carried out at the optimal hour of day for the educational and research program. The purchase of the smaller compressor to supply secondary air was a fairly straightforward decision, but the 1000-kW system requires significant investment in money and time to ensure that the new equipment will provide the capabilities of the existing system.

The close relationship between NAVFAC, the business school and TurboLab largely is due to a research program funded by the Office of Naval Research that specifically emphasizes developing professional expertise within the Navy while simultaneously demonstrating promising new technologies on Navy installations. ESTEP aims to identify promising technologies, and speed their operational adoption. It funds demonstrations of promising technology at Navy installations, emphasizing use of the Navy's organic science and technology (S&T) workforce, so that the knowledge endures beyond the project and keeps on giving in the form of a more capable S&T workforce.

The ESTEP approach also forges connections across Navy communities, in particular between S&T personnel and NAVFAC personnel that create follow-on benefits in a couple of ways:

- First, by demonstrating technologies on an installation, the S&T personnel learn more about the operational and organizational requirements of NAVFAC. The utility rate structure is an example of a NAVFAC consideration of which most S&T personnel might be unaware. Other examples include contracting rules and technical approvals that do not always apply to research projects but are very important in NAVFAC's operations.
- Second, developing professional working relationships between operational NAVFAC engineers and S&T engineers expands opportunities for effective collaboration. NSAM NAVFAC is very open to experimental projects on the installations, and supports and develops

Figure 3. Estimated Bills for TurboLab by Month, Breaking Out Contributions Due to Test Runs



Note: Because rates and start and end dates of billing cycle change, these are estimated based on recent rates and first-of-month start dates for the billing cycle. The daily charge (shown in gray) is unaffected by tests. The dark green shows consumption charges due to tests—their contribution is very small. The dark orange shows the demand charges attributable to test runs. In September, there was one test run, but there was a spike that was not due to gas turbine tests, so the contribution of the test runs is smaller.

relationships with the students and faculty. For example, as described in this article, NSAM worked closely with Gannon as he installed and tested many innovative technologies at TurboLab for the ESTEP, including renewably powered thermal storage for both heating and cooling applications, microgrids based on super-capacitors rather than batteries, and most recently a building-scale compressed-air energy storage system.

The cost-benefit analysis portion of ESTEP in the business school helps S&T engineers identify and quantify the benefits and costs of the technologies, and facilitate their wider adoption. In addition to the ongoing thesis on the effect of demand management on utility bills, Taber has supported many NPS student theses, including two on the benefits of energy management systems and another studying barriers to technology adoption at Navy installations.

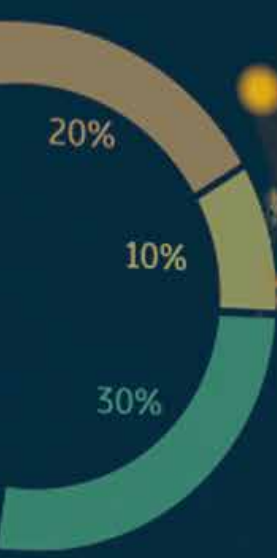
Although Taber is retiring, the NPS faculty and the ESTEP program in particular will continue to benefit from the years of productive collaboration and mutual learning.

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01

02





Spruill Charts a Way Forward

ON DEC. 3, 2018, DEFENSE ACQUISITION UNIVERSITY (DAU) President James P. Woolsey sat down with Dr. Nancy L. Spruill, who is retiring as the director of Acquisition Resources and Analysis in the Office of the Under Secretary of Defense for Acquisition and Sustainment (USD[A&S]). In that role, she has been the lead for Business Cost Estimating and Financial Management (BCEFM) Functional Communities. The following is Mr. Woolsey's interview with Dr. Spruill:

Q. You are a degreed and published statistician. So before you came to the Office of the Secretary of Defense, before you were the executive secretary of Defense Acquisition Boards [DAB], before there even was DAB, you were a statistician first. Other than a strong distaste for ordinates that don't start at zero, how has this background influenced the work you have done and the way you see acquisition?

A. I really value data. I think of problems from the data perspective. What is the data that I have, what is the data I wish I had? And so that was kind of my first thinking. My dream is for there to be a "Statistics of Defense" data division in the Department of Defense [DoD]—similar to Statistics of Income Data Division in the Internal Revenue Service [IRS]. That IRS division's entire job is just take the information and to share it in different ways that informs the public. Now, the IRS folks have an additional constraint that we have sometime: They have to protect the confidentiality of the people, but they do that by grouping their data. And so I always thought it would be wonderful if the DoD took the budget information, the planning information, the scenario information, the threat information—and had it all organized in a way that you could go to one place and get data.

We need good data definitions, databases, and analysts who use the data. We haven't come very far in this area, but I believe the DoD Chief Management Officer is working on this now. However, it requires sharing, which DoD is not very good at.

Q. We haven't made it to your dream, but we have made progress, haven't we, in how much data we collect in a

Photos by Sam Parks, DAU Communications.

sensible way, and how it's available to lots of different people who are looking at problems?

A. Yes. We have made tremendous progress in managing and collecting acquisition data. It has been systemic and sensible. Our greatest partners have been the Services [components] in working with my office to help identify critical data and make that visible and accessible to us in OSD. You can see it today. If you go on the A&S [Acquisition and Sustainment] website, you'll find that you can get a link to our DAMIR [Defense Acquisition Management Information Retrieval], AIR [Acquisition Information Repository] and DAVE [Defense Acquisition Visibility Environment] for authoritative acquisition data. You can learn a lot from this acquisition information. So, yes, we have more work to do but have taken a big first step.

This data has been a beacon, sharing data based upon current access and dissemination rules. My office, through Mark Krzysko, enables others to solve their problems with the sharing of our acquisition data. Key partners—such as Bess Dopkeen in CAPE [the Office of Cost Assessment and Program Evaluation] and folks like Phil Anton, who was in PARCA [Performance Assessments and Root Cause Analyses]—are good examples of consumers, where our acquisition data assisted them with issues they were managing.

There still is a question of sharing between organizations. Everybody tends to be a bear with their data—"I want it for myself." But I suspect that will change, and it is moving it in the direction of change.

Q. But once you collect all the data, you have to do something with it. That brings to mind the famous Spruill Chart—what is it, what are its origins and how is it used?

A. Well, it provides cost information on weapons systems in a standard format, so that's the short version of it. But we were in a DAB one day maybe about 20 years ago and the then Under Secretary for Intelligence Steve Cambone said to me afterward, "Nancy, I can never follow your funding chart." And I said, "Aha. We're going to fix that," and so we just made it standard. And now it has gone from the longest chart and full of discussion to the shortest—because if there were no issues, people could see that; and if there were issues, they knew what they were talking about, they knew how it was calculated. There was no mystery. That allowed us to get to the main question: Is that the right number for this program?

Q. That's a long lifespan for a chart. Pretty impressive. You've seen acquisition go through a lot of things from the Cold War, the drawdown that followed the Cold War,

of course the 9/11 attacks and now the need to move faster to deal with a quickly changing environment. As you look back on all that, what has changed a lot, and what has been consistent? What are the patterns?

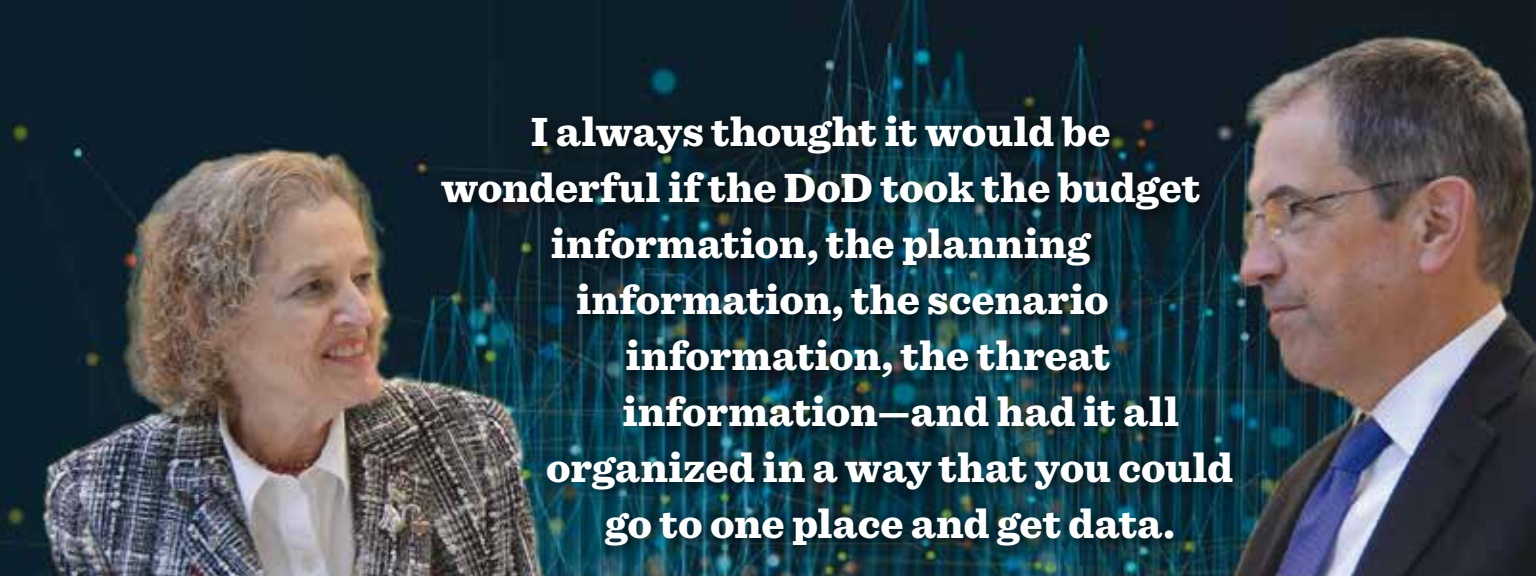
A. Well, there's a lot of consistency. Programs are the basis of what we do in A&S now and earlier, and how they interact with the budget system, the acquisition system. But they have a goal. They need to build a weapon system or whatever. So that, I think, is the same. But I think that there's a lot more shared information than when I first came. But, again, we've not come to the optimum of sharing that we could. But I think a lot of progress has been made over that time, a lot of good thinking by a lot of smart people on how to do acquisitions better, and sharing it among ourselves.

There have been big changes: The Weapons Systems Acquisition Reform Act (2009), and pushing acquisition decisions back to the Services in the current administration. Both are important and show that Congress wants improvements and really cares. However, we still don't share information and data like we should, in my opinion. And I'm talking about more than just acquisition data. We need to share program performance and budget data, too.

Q. The relationship between government and industry is critical, and it has gone through many cycles. Where do you view that relationship today?

A. In terms of shared information. I would give it a C-plus, or maybe a B-minus. It is hard to walk the line between sharing proprietary information and sharing other information. In terms of improving the overall relationship, I would like to see us work something out so government folks could go for 1 or 2 years to industry and vice versa. I know people smarter than me have been working on the exchange problem for a while but I think figuring it out—how to move back and forth between industry and government—would be valuable to both the government and industry (and I think most people agree, it is just that the devil is in the details).

Q. In your career, you've been known as somebody who can work across boundaries, and that's a natural thing to do in the positions you've had and in the Office of the Secretary of Defense [OSD], generally. You have had to work across multiple administrations, you have had to work across organizational boundaries within OSD and the military Services, and so on. When people are looking forward at their careers in OSD, or are in the midst of them now, what advice do you have about how to make that work? How do you work across boundaries and get people to work together who might not be used to it?



I always thought it would be wonderful if the DoD took the budget information, the planning information, the scenario information, the threat information—and had it all organized in a way that you could go to one place and get data.

A. That's an excellent question. I think it involves people. I really don't think you involve people in the way you need to if you only send them an e-mail and tell them to do something. You have to talk with people. Roberto [Rodriguez, from the OSD Comptroller Office] comes and sees us quite a bit. He says, "OK, I need this; I'm thinking about this." He wants to focus; he wants to hear our perspective and he wants to tell us if there is something different about it. Rick Burke [Director of Cost Analysis in CAPE] and I are great friends. I'll look up and in the door walks Rick Burke, and he sits down says, "I need this" or "You sent this and can you explain a little bit more about it?"

The other thing I believe is that you get a lot out of walking around the Pentagon. Do not sit in your office the entire time. I can't tell you how many times I've been walking in the hall and someone will say, "I meant to send this to you; it's really important—I will as soon as I get back," or they download it to me right then.

If you sit in your office and rely on e-mail, you're not going to get half as much done, or build the relationships you need. You have this wonderful, huge building with all these people in it. It's just something that shouldn't be passed up.

I'm an extrovert, so I'm prone to that approach. But I really think that it's the way to do your job.

Q. Are statisticians allowed to be extroverts? I know engineers are not.

A. No, it's discouraged (laughter).

Q. You're one of the first women to have a prominent role in defense acquisition and certainly a trailblazer. How has being a woman in this field affected you, and how has the environment for women changed over your career? What advice would you give to women at various points in their career, or for those who are interested in mentoring other women?

A. Well, let me start my answer with a story. Although I am probably most famous (or infamous) for the Spruill Chart, I also am famous (or infamous) for threatening to sue the U.S. Navy in 1979 because they said I could not go for 5 days on an aircraft carrier, which was deployed in the Mediterranean. For about 4 days I threatened to call my lawyer (I had only talked with the Women's Legal Defense fund—I really didn't have my own lawyer). The Navy got their folks involved—both the Chief of Naval Operations and the Secretary of the Navy—and I finally was able to do my job (looking at consolidating fighter and attack squadrons on aircraft carriers) and went for 5 days on the ship as it sailed from Alexandria, Egypt, to Naples, Italy, doing flight operations, a vertical replenishment, or resupply via helicopter, and other normal activities for a deployed ship.

The most common comment to me by the enlisted men (who had not been told that there was a woman onboard) was, "You are a woman." Usually with no good or bad inference, no nothing—just "you are a woman." A statement of fact. One sailor did ask me how it felt to be one woman on a ship with 5,000 men. I don't remember what I answered him. And, as you know, the Navy survived, and I would say no one was the worse for wear.

Now to your question. My advice to women at any point in their career is to do your job, don't be pushy but do insist on your rights. I kept a diary of who I talked to and what was happening during my back and forth with the Navy, and I'm glad I did. That included a diary of what I had to do to get on board—who I called and what they told me—and my experiences on the entire trip. But no one ever was impolite to me, even among the officers who must have known some of the backstory.

Q. Even as we work to simplify the process, delegate programs to the Services, and try to streamline things generally, coordination work and documentation and the like will still have to get done in some way for some audience, whether it be Congress or the delegated milestone



You get a lot out of walking around the Pentagon. ... I can't tell you how many times I've been walking in the hall and someone will say, "I meant to send this to you; it's really important—I will as soon as I get back."

decision authorities. What's the key to doing that as we go forward?

A. The key is working with the program office, but also working with the other parts of OSD or the Services or whoever has the requirements. We do it in the milestones. And that's one thing we especially do in the case of Nunn-McCurdy major program shortfalls. When people get a Nunn-McCurdy they kind of freeze: "Oh no, I have a Nunn-McCurdy breach." And you would say, "OK, this isn't the end of the world. Let's lay out what you have to do; let's figure out who you have to talk to." We have done it many times, so we can link them up to the right people and kind of say to them, "Your real job is to build this weapons system. Our job is to help you get through the bureaucracy so that you can get your chop to build your weapons system." And that's what I viewed as the role of the DAB executive secretary—to help the programs as they came in, wherever they were. If they need an affordability analysis, let's show what a good affordability analysis is. If they need a good acquisition strategy, show what a good acquisition strategy is. If they need an 808 Report, help them write it. And I think that will be a hard thing for the Services—they'll have to build their own capability of somebody who looks over the whole thing to help their programs.

Q. What have been the most rewarding experiences in your career?

A. Well, I've had a long career, so I will mention four experiences:
(1) Getting hired by the Center for Naval Analyses, after replying to a blind ad in *The Washington Post*. My dad worked for the Federal Reserve, my grandfather for the Bureau of Printing and Engraving. I never thought of working for the military, and in 1971 when I responded to the blind ad, the first thing they asked me, before bringing me in for an interview, was if I had any problems working for the DoD. My answer was, "I never thought about it, but no, I wouldn't have any problems." They had me in and offered me a job

as a research assistant in one of two research divisions, and I was off to a wonderful career.

- (2) Getting on that aircraft carrier, as I discussed earlier.
- (3) And getting a job in the Pentagon, as a GS-15, working in the OUSD for Manpower, Reserve Affairs and Logistics.
- (4) And a close fourth, getting hired as a Senior Executive Service member, working in the Office of the Under Secretary for Acquisition.

Q. If you had a magic wand and could change one thing about the acquisition system, what would it be?

A. That one is easy. I would set up that "Statistics of Defense Acquisition Division" that I mentioned earlier and have everyone—including the Services, the Comptroller and CAPE—share their acquisition, technology and logistics and their funding and expenditure data. And have it all in one place.

Q. After all this time herding cats at DoD, what are your plans now, other than spoiling your actual cats?

A. My husband and I are no longer going to get up every weekday at 0500. And we are going to "delayer" our house. After my dad passed away in 2011, I found in his files, a copy of the first federal taxes (1947) he submitted—by the way, it was 2 pages, and he owed less than \$1, which he paid. I got those same genes. And, I want to visit my sister in Muscatine, Iowa, and Steve's mom, who turns 100 in April, and who lives with Steve's older brother outside Chattanooga, Tennessee. And I do plan to spoil my cats—Bebop and Lula. But after that, I'm not sure.

Q. Well, Nancy, thank you for taking the time to offer us these hard-won bits of wisdom, and, more importantly, thank you for your long and extraordinarily dedicated service to the Department of Defense and to our nation. It has been rewarding and marvelous to work with you, and I wish you all the best.

Negotiation Types and **Power**

Jennifer Miller, D.B.A.



MANY OF US THINK OF NEGOTIATION AS AN ACTIVITY FOR THE AUTO DEALERSHIP. HOWEVER, we negotiate each day, whether with a spouse, child, sales representative or internally with ourselves. Each of those examples is found anywhere other than a dealership lot. For instance, a bargain may be made about what to watch on television, who will do what chores, what will be paid or included with online orders, or whether and how much dessert to have with dinner. Negotiation also has a fascinating power component. Most people recognize six main sources of negotiation power that this article will explain. I will begin with an overarching look at Dr. Stefan Eisen's Negotiation Preferences and Styles, found in *Practical Guide to Negotiating in the Military*, with which many people are familiar.

In his book, Eisen captures negotiation preferences and styles in five categories: insist, cooperate, evade, comply and settle. Each of the identified strategies rests along a dual set of spectrums: task orientation and people orientation. Task orientation concerns the achievement of the goals at hand. That is, how important is the task? Are there task time constraints? Is it a one-time or ongoing task situation? On the other axis, people orientation involves the

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subjective elements including trust, relationships, power and information.

The Five Strategies

Let us look at the negotiation preferences and styles. I offer the five negotiation strategies in no particular order.

(1) Insist is a “my way or the highway” approach for one of the parties in a negotiation to achieve its objectives with little regard to relationships or interests of the opposing party. Although rapid, this approach to negotiations can leave poor aftertastes for others and have short-term gains at long-term costs. I like to think this negotiation preference and style serves parents of younger children well when it comes to matters of bedtime, going to school and brushing teeth. There are many other instances. In the workplace of emergency responders, trauma can disillusion victims, and first responders must make the decisions in the best interest of the victims. We have witnessed this in recent news reports, whether of hurricane rescues or active shooter events.

(2) Next is the cooperate style; this may be the most advantageous for both sides of a negotiation. This style is geared toward satisfying both side’s objectives and maintaining relationships for both the short- and long-terms. More time is involved with the cooperative style as each side of the negotiation will offer its respective goals, information and ideas to reach a mutually satisfying result. However, relationships grow from such engagements for sustained benefits too.

Synergies may arise too because having more minds at work seeking a solution may invite higher value or new value solutions, according to Eisen. I find the cooperate preference and style of negotiation possible in many situations. For instance, a planning committee contacted me about supporting an offsite organizational event. I wanted to support, but could not play a key role. The planning committee was desperate for help in making a positive impression on leadership and conducting the grunt work of market research. In combining our mutual interests, I contributed my recent market for another organization with similar requirements. The planning committee expressed appreciation and ensured shared recognition for a successful event. Once we exchanged information, we built upon our existing objectives to build an even grander set of goals at the best price, time, location and least hassle possible.

During a professional military course, I gained another great example of the cooperate strategy. In the problem set for the students, two parties wanted the same orange. One party wished to eat the orange meat while the other party only wanted the zest. Now, had the parties been unable to share information and take time to appreciate the

opposite party’s goals, a result acceptable to both may not have been achieved. However, the two parties cooperated by successfully sharing the parts of the orange, thereby minimizing waste, each side obtaining the desired parts and setting an example for future relationships and negotiations. Ta da!

(3) Then there is the evade negotiation preference and style. In my humble opinion, evasion is like procrastination—the problem will remain, perhaps grow and likely get worse. This sounds unsavory, right? However, the evade negotiation strategy is functional if the negotiation party considers the matter unimportant or cannot address the issue (by choice or ability) says Eisen in *Practical Guide to Negotiating in the Military*. The evade strategy also can be applied in very emotional situations. The evade strategy would have appeal as a temporary solution until emotions settle to a manageable level for the negotiation parties to engage using another negotiation strategy. Some could say the evade strategy may exist when debtors choose to become delinquent without just cause. During the recession and aftermath, many investors decided to walk away from real estate responsibilities where the investor was “underwater” and willing to tolerate months of debt collection calls, a credit score downgrade and other consequences.

(4) Next we have the comply negotiation preference and style. This strategy has some similarities to the evade strategy concerning a transition of responsibility. In an example, one person going out on a date may be indecisive about where to dine for the night. This is a frequent conflict that many know well. The indecisive party could delegate the choice to the other party with the understanding that compliance could mean an unsavory option for the night (cuisine offerings, commuting distance, price, wait time, service quality, etc.). However, the indecisive party’s goal of preserving the relationship with the other party is accomplished as well as not deciding the venue for the date. Clearly, there is risk for the indecisive party when choosing the comply strategy, so trust would be beneficial and sought as an outcome. In the workplace, examples of the comply strategy include a manager empowering an employee to make increasingly important decisions on an assigned project.

(5) Finally, there is the settle negotiation preference and style. The settle negotiation strategy seems more like another phrase for compromise. Eisen in *Practical Guide to Negotiating in the Military* reasons that it is a feasible option when the insist strategy and the comply strategy appear unlikely. In essence, both sides of the negotiation achieve some interests but sacrifice others. The relationship between the parties suffers, although the efficient results are appealing. One may argue the effectiveness of the settle strategy outcome suffers from the gain in efficiency.

Examples of the settle strategy include large purchases like autos and real estate or haggling at yard sales. Who does not love a good old haggle over price or what other goods and or services can be thrown in to close the deal?

Sources of Power

Thus far I have neglected to explicitly mention and elaborate on the forms of power present in negotiation, yet power is a critical component of negotiation. Most people recognize six main sources of negotiation power: expert, referent, position, coercive, reward and influence. As experts in our areas of accounting, audit, finance, analysis, cost, budget and many other comptroller-related areas, we know the power of being the “go to” person as people remark of our expertise. We know the subject matter well and those who lack this subject-matter expertise yield to us for decision support. We have expert power the same way that dentists, electricians, engineers, plumbers, realtors and other specialists are sought for expertise demonstrated by up-to-date certifications, licenses and continuous education.

Then there is reference power, also known as charismatic power. On encountering a new group of people, we may gain or give power based on observed accents, appearance or another attribute possessed by some individuals but not others. For example, at a conference in Scotland, I gravitated toward those people who sounded most American in speech. Charismatic definitions vary. Others indicate that power stems from physical attraction like proportionality, height and movement. Of course, different cultural preference would heavily influence what is considered charismatic using physical appearance-based definitions.

Position power is a third and powerful source of power, especially in the military environment where the Uniform Code of Military Justice applies. At random selection of rank in this example, we know a technical sergeant of the Air Force would not supervise an Army colonel from a table of distribution and allowances organization chart. However, position power takes many forms, so a technical sergeant may yield power if located at a headquarters with a colonel located at a garrison. Position power is also known as legitimate power since it is seen, like a crown on a royal head. Additional observations of position power exist in company annual reports, organizational charts, seating at events and among group interactions.

Coercive power tends to convey a negative connotation. However, coercive power is based on perception, so the risks could be high for the power-yielding party. In a humorous example, two male birds may make a show of power by performing a ritualistic pattern of fluffing feathers, changing color, and crowing to create a powerful illusion of being the bigger, stronger and better-suited mate.

For more information, see *Practical Guide to Negotiating in the Military* by Stefan Eisen, 2011, 2nd ed., Maxwell Air Force Base, Alabama; U.S. Air Force Center for Negotiation Excellence, Air University.

However, if one bird startles, gets soaked with a hose, or stumbles, then the show is over and the façade of being better is lost. The opposing bird and surrounding females will see the reality. Coercive power among humans is similar. As children, we may have been told or asked about our fears of false perceptions of harm from others, only to look back and realize that the perceptions were unrealistic.

Next is reward power, which has a dual purpose attribute. For instance, a supervisor can reward someone for desired actions. The reward can fluctuate according to actions. I liken this to my experience earning bonuses for commission-based sales in the private sector. Rather than a flat rate, I was rewarded on a sliding scale in addition to basic rewards. In another position, I competed with myself and others to maximize the reward received. On the other hand, a reward may be based on a limited pool of money, time off, or other type of reward resource so that less reward for one person equates to more reward for other(s) or vice versa.

Finally, influence is a source of power uniquely combining other powers. Interactions with others form influential power. Influence can draw people or deter people. Children are influenced by teachers because of the potential for reward or punishment, whether real or perceived. Thus, teachers yield great influence power. Candidates for public office also have influence power because of their constituent activities demonstrating success, power and sources of support that inspire influence.

Conclusion

Every day we encounter negotiations such as those discussed above. These extend to negotiating with a spouse, child, sales representative or even internally with ourselves. It is hoped that the examples of five types of negotiation preferences and styles—including insist, cooperate, evade, comply and settle strategies—contributed to your thinking about negotiation. This article then ventured into the six commonly recognized sources of power leveraged when navigating the Negotiation Preferences and Styles that Eisen has written about in many works. A variety of examples conveyed the sources of power in real life.

I wish you well in your future negotiations and leveraging power—whether at the dealership, yard sale, home, work or elsewhere.

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CELEBRATING

20

Years of
AcqDemo

Scott Wortman

THE DEPARTMENT OF DEFENSE (DOD) CIVILIAN ACQUISITION WORKFORCE PERSONNEL DEMONSTRATION Project (AcqDemo) is celebrating 20 years of enhancing workforce quality, management and professionalism.

AcqDemo has provided an inherently flexible pay and personnel management system. The Human Capital Initiatives (HCI) directorate, under the Office of the Under Secretary of Defense for Acquisition and Sustainment (USD([A&S])), manages the AcqDemo program across the DoD. Continuously seeking greater efficiencies and flexibilities, HCI collaborates with stakeholders to streamline processes for significant improvements to AcqDemo and enhanced workforce quality and professionalism.

The most significant recent improvements since inception include simplification of the contribution assessment process; addition of a performance appraisal in compliance with changes in Reduction-in-Force (RIF) procedures; simplified and

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accelerated hiring; Contribution-Based Compensation and Appraisal System (CCAS) updates; modified appointment authorities; enhanced academic degree and certification training; student relocation incentives; and the Voluntary Emeritus Program. For the specific details, see the *Federal Register* notice (82 FR 52104) dated Nov. 9, 2017.

For 20 years, AcqDemo has provided a system that retains, recognizes and rewards employees for their contributions and supports their personal and professional development.

Background

AcqDemo was implemented on Feb. 7, 1999, in accordance with the *Federal Register* notice (62 FR 1426) of Jan. 8, 1999. One of the goals of the Defense Acquisition Workforce Improvement Act (DAWIA) was creation of well-trained, multi-skilled professionals who could effectively manage multi-million-dollar programs. AcqDemo supports DAWIA in demonstrating the effectiveness of DoD acquisition by allowing greater managerial control over personnel processes and functions and expanding the employees' opportunities through a more responsive and flexible personnel system. The introduction of AcqDemo increased flexibilities in recruitment, staffing, classification, performance management, compensation and employee development. AcqDemo also provided a dramatically different way of recognizing employee contributions in contrast to the very inflexible General Schedule (GS) system that based salary increases on meeting minimal performance standards and length of service.

Since AcqDemo's 1999 start, Congress has repeatedly extended AcqDemo's temporary authority. As a result of the Fiscal Year (FY) 2016 extension in the National Defense Authorization Act (NDAA), AcqDemo's participation has doubled to more than 40,000 DoD employees. To enhance DoD's AcqDemo success, Congress, in the FY 2011 NDAA codified AcqDemo into Title 10 of the United States Code and, through the FY 2017 NDAA, transferred full management authority for AcqDemo from the Office of Personnel Management (OPM) to the Secretary of Defense (SECDEF).

Benefits

AcqDemo has garnered numerous participants over its 20 years of service by offering a host of benefits. AcqDemo also is the first alternative personnel program to cross DoD component lines, and now includes representation from the Army, Navy, Marine Corps, Air Force, DoD Office of the Secretary organizations, Defense agencies and Field Activities.

AcqDemo provides multiple advantages to its diverse set of participants. The project offers the potential for faster promotion advancement than the standard federal GS

process. It also grants supervisors flexibility to adequately compensate employees through nontraditional salary increases and award payments.

"My experience as an AcqDemo employee was positive due to the negotiations of my salary upon assignment to an AcqDemo position, the salary increases that were sooner and greater than under the General Schedule, and the yearly performance awards due to my contributions to the mission and goals of my organization," said Jerold A. Lee, a former Department of the Army AcqDemo program director, who now works as a contractor with the DoD AcqDemo Program Office.

AcqDemo offers a simplified classification system. The current GS system includes 434 occupational series grouped into 22 occupational families. AcqDemo retains the occupational series and titles, but the occupational families are replaced by three career paths: Business Management and Technical Management Professional (NH), Technical Management Support (NJ), and Administrative Support (NK). In what is known as broadbanding, AcqDemo groups the acquisition occupations with similar characteristics into the three career paths with four broadband levels for each career path. The system is designed to facilitate pay progression and internal assignment of duties while allowing for more competitive recruiting of quality candidates at differing pay rates.

AcqDemo also uses a streamlined hiring process so that participating organizations can expedite the hiring and appointment of qualified persons to acquisition positions and direct support positions. AcqDemo includes appointment flexibilities designed to make DoD's acquisition organizations more agile and improve their ability to compete for talent, especially from the private sector. Hiring managers in participating organizations can make on-the-spot tentative job offers to candidates at recruiting events when using noncompetitive or direct hiring authority.

Table 1. AcqDemo Broadband Salary Ranges

Business and Technical Management Professional (NH)			
I	II	III	IV
(GS 1-4)	(GS 5-11)	(GS 12-13)	(GS 14-15)
Technical Management Support (NJ)			
I	II	III	IV
(GS 1-4)	(GS 5-8)	(GS 9-11)	(GS 12-13)
Administrative Support (NK)			
I	II	III	
(GS 1-4)	(GS 5-7)	(GS 8-10)	

Source of Figure and Table: AcqDemo Program Office



The introduction of AcqDemo increased flexibilities in recruitment, staffing, classification, performance management, compensation, and employee development.

Recruitment of students often is limited to the local commuting area of the employing organization or perhaps because it may prove cost prohibitive for college students to relocate for student intern job offers in a commuting area away from their college or university or their permanent home residence. To alleviate this barrier to recruiting the next generation of high performers, AcqDemo offers the option to the head of a participating organization to approve relocation incentives for new student interns and relocation incentives to student interns whose worksites are in a different geographic location than that of their college or university or their home residence each time the interns return to duty at their official worksites.

In addition to the Expedited Hiring Authority available to all DoD hiring officials, AcqDemo has four unique direct hire appointment authorities available for AcqDemo participating organizations, including Veterans, select positions within AcqDemo's Business Management and Technical Management Professional (NH) and Technical Management Support (NJ) Career Paths, Student Interns, and for specific scholastic achievements.

AcqDemo utilizes supervisory and team leader cash differentials as an additional incentive for difficult-to-fill or particularly challenging positions. Heads of participating organizations can use supervisory and team leader cash differentials as an additional tool to incentivize and compensate supervisors and team leaders as defined by OPM's General Schedule Supervisory Guide or Leader Grade Evaluation Guide.

AcqDemo offers an Accelerated Compensation for Developmental Positions (ACDP), which permits more frequent basic pay increases for developmental positions that would normally occur with the annual CCAS pay pool payout. This allows participating organizations to be more competitive with industry by advancing employees through their career progression and aligning pay with those advances. Eligible employees participate in formal training programs, internships or other developmental efforts that allow them to advance in their acquisition career.

AcqDemo offers sabbaticals. Eligible employees have opportunities to engage in a work or study experience that

will contribute to their professional development. The program lets employees use their sabbatical for training with business, manufacturing or on-the-job work experience with public, private or nonprofit organizations.

In 2000, the first sabbatical was approved by Program Executive Officer for Command, Control and Communications Systems (C3S) for a Field Artillery Tactical Data Systems Project Manager. The sabbatical allowed him to attend the Naval Postgraduate School (NPS) in Monterey, California, where he developed curriculum for the first-ever doctorate-level degree program in systems acquisition, taught graduate-level classes in systems management and systems acquisition, and instructed personnel enrolled in the NPS distance-learning program.

AcqDemo's Voluntary Emeritus Program ensures continued quality acquisition by allowing retired or separated civilian employees who served in either DAWIA-covered positions or positions directly supporting DAWIA-covered positions and non-AcqDemo retired or separated civilian employees and former military members who worked in DAWIA-covered positions to accept retirement while retaining ties to the acquisition community. Heads of a participating organization can temporarily retain the services of retired or separated individuals to provide on-the-job training, work on a special project or mentor less experienced employees.

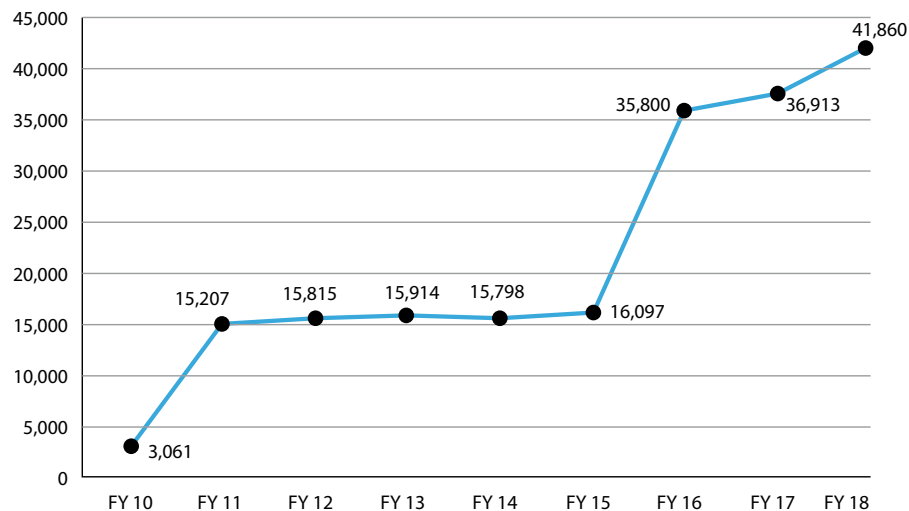
Permanence

To attract and retain a motivated, diverse and highly skilled civilian workforce, we must recognize that lock-step career progression is contrary to recognition and growth. The GS system fails to recognize the differences in individual capabilities and will never enable DoD agencies to compete with industry for essential talent. Simply stated, an inflexible, one-size-fits-all salary system is out of sync with reality.

AcqDemo is a proven and innovative performance management system. Recent growth indicates that more acquisition organizations realize the need for AcqDemo flexibilities in order to compete with the private sector, other demonstration projects, and other federal agencies in attracting and retaining a high-quality workforce.

Permanence of AcqDemo will greatly increase confidence by acquisition organizations to convert their acquisition workforce to AcqDemo. Permanence will enable DoD to retain the highly successful personnel initiatives implemented through AcqDemo; retain the ability to create new personnel programs expeditiously to meet emerging acquisition requirements; and maintain dedicated personnel systems designed to enhance the agility, effectiveness and professionalism of DoD's acquisition workforce and direct support personnel.

Figure 1. AcqDemo Growth and Expansion



With 20 years of success, increasing participation, and looking to the future, AcqDemo seeks permanency as an alternative personnel system in the DoD.

Join AcqDemo

HCI invites all eligible acquisition organizations that have not yet opted to join AcqDemo to check out the improved AcqDemo and to see if it will be a good fit for your organizations and your acquisition professionals. To participate, an organization must meet the following criteria: "at least one-third of the workforce participating in the demonstration project consist of members of the acquisition workforce; and at least two-thirds of the workforce participating

in the demonstration project consist of members of the acquisition workforce and supporting personnel assigned to work directly with the acquisition workforce." (NDAA of 2004), and comply with the eligibility requirements as outlined in the AcqDemo Operating Guidance. DoD organizations interested in participating in AcqDemo can contact the author of this article at scott.wortman@hci.mil.

Additional information about AcqDemo, including training and guidance resources, is available on the AcqDemo website (<http://acqdemo.hci.mil>).

The author can be contacted at scott.wortman@hci.mil.

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HERMES WINNERS



CONGRATULATIONS

to the production teams of both *Defense Acquisition Research Journal* (*Defense ARJ*) and *Defense Acquisition* magazine (formerly *Defense AT&L*) for winning the Platinum and Gold HERMES awards, respectively. The HERMES award, sponsored by the Association of Marketing and Communication Professionals, honors the messengers and creators of traditional and emerging media. This has been an award-filled time for both publications as the *Defense ARJ* earned MARCOM, APEX, and HERMES awards within a 12-month period, while the *Defense Acquisition* magazine team received MARCOM, APEX, HERMES, Blue Pencil, and Gold Screen awards. Both teams have consistently demonstrated publication excellence in the processing and production of Defense Acquisition University Press printed, online and digital media.

First Row from Left to Right: Norene Johnson (Managing Editor, *Defense ARJ*) and Benjamin Tyree (Managing Editor, *Defense Acquisition* magazine)

Second Row from Left to Right: Emily Beliles (Assistant Editor, *Defense ARJ*), Michael Krukowski (Lead Designer, *Defense ARJ*), and Tia Gray (Art Director, *Defense Acquisition* magazine)

DEFENSE ACQUISITION WORKFORCE

2018 *Awards*

The Honorable Ellen Lord, Under Secretary of Defense for Acquisition and Sustainment (USD[A&S]) hosted the Defense Acquisition Workforce Awards ceremony on Feb. 5, 2019, with distinguished guest LTG Anthony Ierardi, Director for Force Structure, Resources and Assessment (J8), Joint Staff, who addressed the significance of the Individual Achievement Award in the category of Requirements Management. The ceremony recognized acquisition professionals and organizations for their commitment to acquisition excellence through the presentation of the:

Defense Acquisition Workforce Individual Achievement Awards

Flexibility in Contracting Award

Defense Acquisition Workforce Development Innovation Awards

The Defense Acquisition Workforce Individual Achievement Awards highlight individuals who demonstrated an exemplary commitment to excellence and professionalism in the acquisition of products and services for the Department of Defense (DoD). These awards recognize individuals in each of the 17 acquisition functional disciplines.

The Flexibility in Contracting Award was established by Section 834 of the National Defense Authorization Act for Fiscal Year 2017. The award recognizes outstanding professionals who have, in their approach to program management and contracting, demonstrated “innovation and local adaptation” by using the flexibilities and authorities granted by the Federal Acquisition Regulation and the DoD Instruction 5000.02 (Operation of the Defense Acquisition System) to increase the efficiency of programs.

The Defense Acquisition Workforce Development Innovation Awards were established to recognize excellence by acquisition organizations in developing unique and innovative solutions to ensure that their workforce is well equipped to deliver world-class capabilities to the warfighter. The awards highlight exceptional outside-the-box thinking and progress in tackling workforce development challenges.

Individual Achievement Award Winners

CDR Jake Haff | U.S. Special Operations Command | Requirements Management

CDR Jake Haff successfully analyzed, validated and approved 15 Combat Mission Needs Statements providing battlefield capability that prevented cataclysm and loss of life for deployed National and Theater Special Operations Forces. His leadership proved vital to aligning the U.S. Special Operations Command's acquisition capability against dynamic operational challenges facing the Special Operations Forces Component and Theater Special Operations Commands on the battlefield.

Maj Jenny Ji | U.S. Air Force | Acquisition in an Expeditionary Environment

Maj Jenny Ji led and executed NATO-funded projects totaling \$42 million, ensuring the unimpeded flow of materials and expert advisors supporting the Afghan National Army and Police. Maj Ji's technical knowledge averted a 1-year delay in the upgrade of a \$60 million biometrics identification system, protecting more than 9,000 U.S. and coalition warfighters. Her leadership ensured sustainable police forensics and military intelligence capabilities throughout Afghanistan.

Mr. Paul Lefevor | Defense Contract Audit Agency | Auditing

Mr. Paul Lefevor achieved net savings for the DoD and the taxpayer of more than \$51 million. He managed and provided technical guidance in the successful completion of 42 years of final indirect rate assignments, enabling the DoD to close hundreds of open contracts. He ensured customer needs were met throughout the audit process as well as during negotiations. Mr. Lefevor's leadership and innovative approaches in aligning resources to meet requirements were essential to achieving successful acquisition outcomes.

Photos by Mr. Dirke Williams, Office of the Under Secretary of Defense for Acquisition and Sustainment.



Left to right: The Honorable Ellen Lord, CDR Jake Haff, and LTG Anthony Ierardi



The Honorable Ellen Lord and Maj Jenny Ji



The Honorable Ellen Lord and Mr. Paul Lefevor



The Honorable Ellen Lord and Ms. Doneise Lamb



The Honorable Ellen Lord and Mr. John Stedge



The Honorable Ellen Lord and Lt Col Bennet Burton

Ms. Doneise Lamb | National Security Agency | Contracting and Procurement

Ms. Doneise Lamb leads the largest contracting division of the National Security Agency (NSA) and a portfolio valued at \$1.8 billion. Ms. Lamb improved acquisition processes, strengthening partnerships with industry and increasing the quality of support. She led one of NSA's major analytics modernization initiatives, successfully employing joint government and contractor agile software development. Ms. Lamb has been a catalyst within NSA's contracting organization, focusing her energy on training and developing the next generation of NSA acquisition professionals needed to assure the security of U.S. operations, data and information.

Mr. John Stedge | U.S. Air Force | Cost Estimating

Mr. John Stedge's leadership directly improved business procedures, resulting in process enhancements and analysis that supported a new nuclear weapon system acquisition valued at more than \$83 billion. Mr. Stedge shepherded the organization through a massive institutional change focused on improving cost analysis and financial requirements generation, data-driven decision support, risk-based resource allocation, and innovative Cost Capability Tradeoff Analysis. This major cost reorganization effort saved the Air Force \$2 billion.

Lt Col Bennet Burton | U.S. Air Force | Earned Value Management

Lt Col Bennet Burton established a metrics-based award fee plan for an operations and sustainment contract and drove an urgent modification for a \$130 million asset, creating a detailed schedule plan and doubling combat options. He created unique scheduling efforts ensuring the successful procurement of a \$13 billion high-priority system. His leadership drove the utilization of earned-value quantifiable backup data techniques to force accountability and reduce open items by 30 percent. His approach saved \$130 million and added up to 9 years of operational capability to this high-priority system.

Mr. James Kettner | U.S. Army | Engineering

Mr. James Kettner delivered an initial capability to the warfighter in only 11 months, while saving more than \$14 million in hardware, operations, and support costs for the U.S. Army Cyber Command. He engineered and delivered the Rapid Cyber Development Network and the Cyber-Tool Development Environment and Platform. His leadership gave the Army a capability that radically improves operational responsiveness and relevancy in the cyber warfare domain.



The Honorable Ellen Lord and Mr. James Kettner

Mr. Robert Fox | U.S. Army | Facilities Engineering

Mr. Robert Fox supported a \$2.9 billion program for U.S. and foreign military sales. He executed 82 contract actions, of which 69 were awarded, for an estimated \$100 million. He developed seven new indefinite delivery-indefinite quantity contracts, for approximately \$267 million, and developed the *Afghanistan Military Cost Book*. As a result of his leadership, the U.S. Army Corps of Engineers accelerated support to the warfighter while achieving cost savings and reducing procurement lead time.



The Honorable Ellen Lord and Mr. Robert Fox

Ms. Cassandra Simmons-Brown | U.S. Army | Financial Management

Ms. Cassandra Simmons-Brown led a team responsible for establishing and monitoring the business practices across five program offices. She executed \$1.7 billion spanning three funding sources, multiple appropriations, and multiple accounting systems. Her leadership resulted in the effective transformation and merger of the Business Operations, Audit Management, and Financial Systems Integration offices into one high-functioning directorate.



The Honorable Ellen Lord and Ms. Cassandra Simmons-Brown



The Honorable Ellen Lord and Maj Giacomo Saucedo



The Honorable Ellen Lord and Mr. Billy McCain



The Honorable Ellen Lord and Ms. Christina Fontanos

Maj Giacomo Saucedo | U.S. Air Force | Information Technology

Maj Giacomo Saucedo protected the U.S. and allied use of the Global Positioning System against evolving cyber threats. He overhauled a volatile command and control system design, reducing cyber engineering processing time by 3 months, and averting a 9-month, \$60 million schedule overrun. His leadership and warfighter mentality increased the responsiveness, security, and integrity of this vital worldwide utility for 2 billion users.

Mr. Billy McCain | U.S. Army | Life Cycle Logistics

Mr. Billy McCain migrated more than 20,000 Army units from the legacy Standard Army Management Information Systems to the Global Combat Support System-Army, converting property valued at more than \$356 billion; issued more than 1 million certificates of training; and fielded more than 21,000 hand-held terminals. His leadership resulted in the successful management of the turbulent fielding schedule, delivery of New Equipment Training in multiple business areas, and it enabled the institutional training transition.

Ms. Christina Fontanos | U.S. Navy | Production, Quality, and Manufacturing

Ms. Christina Fontanos has demonstrated a commitment to furthering the professionalism of the Production, Quality, and Manufacturing community. She developed a comprehensive Production, Quality, and Manufacturing training pipeline that expedited the development of skill sets necessary for the Naval Aviation Enterprise junior workforce. Ms. Fontanos also supervised review of production contract proposals on a complex missile program, leading the team through technical evaluations of 71 supplier proposals and Basis of Estimates for a \$453 million defense contract. Her leadership saved the government \$104 million.

Lt Col Ellen Ellis | National Reconnaissance Office | Program Management

Lt Col Ellen Ellis expertly managed two National Reconnaissance Office (NRO) Acquisition Category I equivalent programs that modernized NRO imagery processing in a service-oriented architecture on commercial Cloud infrastructure. Her leadership sustained four operational baselines maintaining an operational availability of 99.8 percent, ensuring processing and delivery of more than 12,000 imagery products per day to both national-level and theater-level analysts and warfighters.

Mr. Michael Hogan | U.S. Air Force | Science and Technology Manager

Mr. Michael Hogan led a team that successfully launched the Operationally Responsive Space 5 Sensor Satellite to meet an urgent need in space situational awareness within challenging cost constraints in an unprecedented 3 years. The mission served as a pathfinder for small satellite technology and procurement. The satellite was the first to operate on the Multi-Mission Satellite Operations Center 2.1 ground system and was the first Minotaur IV to launch from Cape Canaveral. His leadership ensured rapid issue resolution while maintaining program schedule and cost.

1st Lt Christian Todd | U.S. Air Force | Services Acquisition

1st Lt Christian Todd provided critical leadership for the engineering contract rebaseline effort, in which he overhauled 481 obsolescent requirements. He delivered \$241 million dollars in essential services enabling Assured Access to Space for the U.S. Government on five National Security Space missions valued at more than \$4 billion. 1st Lt Todd's leadership was also instrumental in executing the first Launch Enterprise engineering contract industry day for a potential multimillion-dollar follow-on contract.



The Honorable Ellen Lord and Lt Col Ellen Ellis



The Honorable Ellen Lord and Mr. Michael Hogan



The Honorable Ellen Lord and 1st Lt Christian Todd



The Honorable Ellen Lord and Mr. Anthony Aldrich

Mr. Anthony Aldrich | U.S. Special Operations Command | Small Business

Mr. Anthony Aldrich, program manager for the Small Business Innovative Research program, achieved a 139 percent increase in small business awards, almost a 50 percent increase in Total Obligation Authority, and a 247 percent increase in small business participation. He increased the number of awards to small businesses by streamlining acquisition procedures and using innovative techniques that provide similar flexibilities to Other Transaction Agreement contracts. Mr. Aldrich's leadership established new customer alliances and developed vendors that will drive Special Forces toward their next generation solutions.



The Honorable Ellen Lord and Mr. Daniel Ensminger

Mr. Daniel Ensminger | U.S. Navy | Test and Evaluation

Mr. Daniel Ensminger routinely challenged institutional norms to create an abbreviated test strategy as the Test and Evaluation Working Integrated Product Team Lead for the Long-Range Anti-Ship Missile Program. His use of Modeling and Simulation and Capabilities-Based Test and Evaluation allowed the test team to rapidly execute the test program, provide data supporting a viable Fleet envelope, and produce cost savings of more than \$500 million by reducing the number of live test flights. Mr. Ensminger's leadership paved the way for getting a crucial weapon to the warfighter in record time, setting the standard for future rapid acquisition and test efforts.



Left to right: Ms. Amy Smith, Ms. Cindy Evers, Mr. Kurt Ettrich, The Honorable Ellen Lord, Mr. David Rohlinger and Ms. Brindle Summers

Flexibility in Contracting Award Winners

Air Force Materiel Command Federal Acquisition Regulation 16.5 High Performance Team
Wright-Patterson Air Force Base, Ohio

The Federal Acquisition Regulation 16.5 High Performance Team provided strategy advice to the \$985 million C-17 simulator program, shaving 75 days off the acquisition and \$66 million off the predecessor contract. The team assisted an IT service effort reducing cycle times by 43 percent and saving \$1.1 million. The team's innovation and leadership saved acquisitions an average 84 days, or 48 percent, and \$5.8 million in acquisition costs.

Workforce Development Innovation Award Winners

Large Organization

Space and Naval Warfare Systems Center Atlantic
North Charleston, South Carolina

The Space and Naval Warfare Systems Center Atlantic launched the Cyber Education and Certification Readiness Facility. The creation of this training facility bolstered Space and Naval Warfare Systems Center Atlantic's success in mastering the cyber space domain and yielded a cost savings of more than \$2 million. The creativity and innovation of the Cyber Education and Certification Readiness Facility represents a major step forward in the Space and Naval Warfare Systems Center Atlantic's investment in credentialing its technical workforce and developing cybersecurity specialists to improve the fleet information system.

Small Organization

United States Naval Test Pilot School
Patuxent River, Maryland

The United States Naval Test Pilot School trained 72 Test Pilots, Flight Officers, and Flight Test Engineers through a rigorous 11-month course and trained an additional 195 flight test personnel and aircrew via rapid targeted flight test courses to improve the competency and quality of Test and Evaluation personnel. The United States Naval Test Pilot School directly improved the professionalism of the Test and Evaluation community by establishing a research cell, hosting a multinational Test Pilot conference, and training personnel from other federal agencies and partnering countries. Through their leadership, they refined the optimal mix of classroom, simulation lab, inflight instruction, and active feedback, critical to the successful execution of complex developmental test programs supporting the delivery of enhanced capabilities to warfighters.



Left to right: Mr. Christopher Miller, Ms. Pamela Bell, The Honorable Ellen Lord, Mr. Kamau Buffalo, Mr. Fred Bisel and Mr. Wesley Jones



Left to right: CDR Glenn Rioux, The Honorable Ellen Lord and Mr. John Hardison

DEFENSE ACQUISITION

WRITERS' GUIDELINES IN BRIEF

Purpose

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.

Submission Procedures

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

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

Deadlines

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

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

Audience

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

Style

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

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

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

Length

Articles should be 1,500-2,500 words.

Format

Send submissions via e-mail as Microsoft Word attachments.

Graphics

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

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

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