IN PERSON

Assistant Secretary of Defense (L&MR)
Alan F. Estevez

Mission Command Battle Lab
Science and Technology Seminar
with the Command and General
Staff College

The Fallacy of Quantifying Risk

How to Form an IPT

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Defense AT&L Magazine Author Submission Tips

*D*efense AT&L magazine receives many inquiries about how to compose an article that will have the best chance of being accepted for publication and need the least amount of editing. In addition to a careful read of the "Writers' Guidelines in Brief" (elsewhere in these pages), here are a few additional suggestions:

DO NOT begin with a quote unless it is pithy, surprising, and from a truly famous speaker. (That means historical figures, Nobel laureates, and well-known literary authors—not management gurus.) The purpose is to spark curiosity or impart a historical perspective, not supply a secondhand patina of legitimacy. Starting with a quote is so overdone that it's usually not a good idea.

DO NOT begin your article with a discussion of what your article is going to be about. This might make sense in a verbal presentation, but in a written piece, just get to the point.

DO NOT structure your article like a research paper (Purpose, Methods, Results, Conclusion). *Defense ARJ* is a research journal; *Defense AT&L* is a magazine of feature articles and firsthand accounts.

DO NOT insert graphics or photos into your article. Send them as separate e-mail attachments.

DO NOT indent paragraphs. Skip a line between them.

DO NOT insert lengthy URLs into the text. A brief URL (i.e., short enough that someone could type it into a browser window from memory with ease) is permitted. Better yet is a brief instruction (e.g., "...is available via the Acquisition Community Connection website").

DO NOT capitalize any word or phrase you regard as important. You're not writing a mortgage document. It doesn't matter if there is an acronym for the phrase. If it's not a proper noun, it shouldn't be capitalized. E.g., "test and evaluation" does not get caps, but "Office of the Secretary of Defense" does, because it's the official name of a specific office.

DO NOT quote your boss. Or his/her boss. It's obsequious. (If your boss wants to be a coauthor of the paper, fine. But there can be no more than five authors.)

DO NOT include reference citations. Quoting from previously published works is discouraged. (Brief quotes from published documents are fine if they are truly critical to the article.)

DO NOT include a "summary" section. If you're summarizing what you've already said, you're repeating it. Conclusions are acceptable, but summaries are redundant.

DO use your article to tell a story. Think of the other readers as your fellow acquisition professionals, sitting around trading stories and learning from each other.

DO write about failures and challenges, as well as successes. How you handled a problem is vastly more instructional than is the trumpeting of a success. Writing about a failure—even a mistake you made—shows confidence and openness.

DO include specific examples to back up your assertions, whether they be data, personal career anecdotes (program names expunged if need be), or events from history.

DO give your opinion *if* you back it up with evidence. Using first-person is OK!

DO be sure to include your e-mail address and a two-sentence bio (including your current title) at the end of the text in the same document.

DO supply relevant figures and high-resolution photos, each e-mailed as a separate attachment. (If you send photos, do include captions.)

DO feel free to supply a very brief blurb for the table of contents, describing your article in one or two sentences. (This may or may not be used, at the managing editor's discretion.)

DO feel free to suggest callout quotes. (These may or may not be used, depending on space limitations.)

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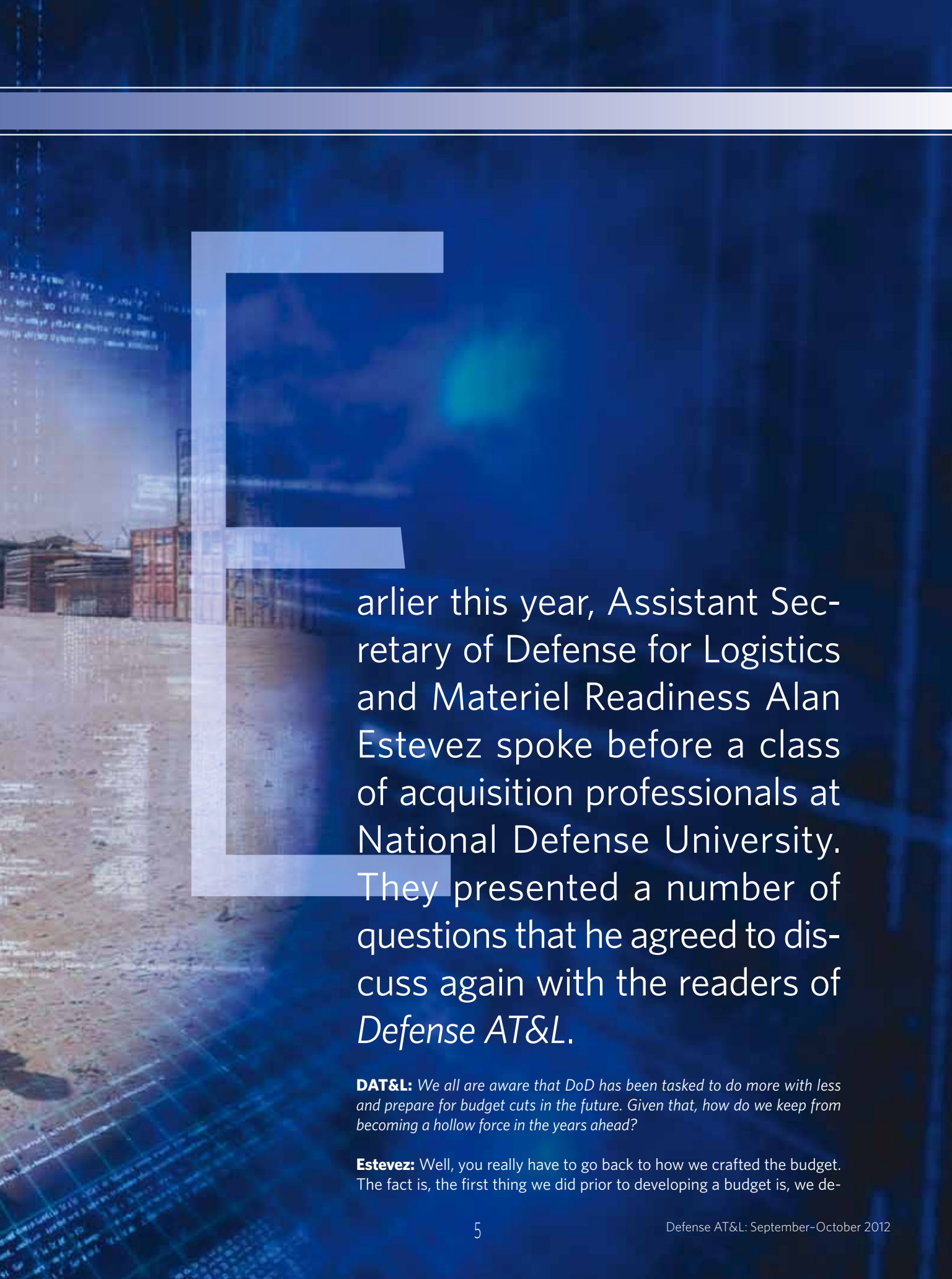
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Assistant Secretary of Defense (L&MR)
Alan F. Estevez

Earlier this year, Assistant Secretary of Defense for Logistics and Materiel Readiness Alan Estevez spoke before a class of acquisition professionals at National Defense University. They presented a number of questions that he agreed to discuss again with the readers of *Defense AT&L*.

DAT&L: *We all are aware that DoD has been tasked to do more with less and prepare for budget cuts in the future. Given that, how do we keep from becoming a hollow force in the years ahead?*

Estevez: Well, you really have to go back to how we crafted the budget. The fact is, the first thing we did prior to developing a budget is, we de-

vised a defense strategy, recognizing the targets that were in the Budget Control Act for that budget. The defense strategy came before we put dollars against programs in the budget. So we built a strategy that rebalances our global posture and presence, emphasizing Asia-Pacific while continuing our efforts in the Middle East. Of course, this doesn't mean that we walk away from our commitments globally. After reshaping our defense strategy, we sized the force and our programs around that strategy, carefully crafted with the Services and Service leadership.

We then built a budget that can sustain the force that we have which in turn sustains the strategy. Now with that said, we must remain capable of responding to the changing nature of warfare. This will potentially require us to make adjustments in the budget to cover those gaps.

In the budget submission, we sustained R&D, and we essentially sustained our modernization programs. We ensured some of the poor performers were terminated. By ensuring a deliberate planning process in developing the strategy, force structure, and the budget, it demonstrated that we have the ability to sustain the force structure as designed—which should preclude DoD from having a hollow force.

DAT&L: *In addition to R&D and modernization, what other priorities are there?*

Estevez: From a logistics standpoint, I essentially have four priorities: First, sustaining current operations. We are still engaged in Afghanistan, which is a very tough place from the logistics standpoint to be at war, because it's a landlocked country. And it's surrounded by at least one country that is definitely not our friend and other countries that have their own ways of doing things. And so we have to work through that. So doing that is job one. And there are a couple of facets to that: One is again, sustaining the forces on the ground—continuing, as the enemy adapts, to adapt back.

So under the leadership of Sec. Panetta, Dr. Carter, and previously, Sec. Gates, we put a great effort into increasing the capability of the force—ISR capabilities, small devices like hand-held ground-wire detectors that find IEDs, and MRAPS. There are about 14,000 MRAPS of varying types in Afghanistan, and we're sustaining those at a well over 90 percent readiness rate—very good.

Even with closure of PAK GLOC [Pakistani Ground Lines of Communication], we've done a great job of sustaining the force there. We had some challenges with food and fuel, but essentially, we're actually on the rise for both of those commodities right now. And that, frankly, is because of the great efforts of the logisticians in theater, the Defense Logistics Agency, and United States Transportation Command in supporting that.

We can talk about retrograde down the pike: Getting out of Afghanistan is also going to be a real trick—much tougher than the retrograde from Iraq, which was no mean feat in and of itself. So that's job one.

Moving down the line: We've learned many lessons in the last 10 years or so in our contracting environment—contracting for support on the battlefield. We have a couple of lessons that were provided by other organizations. Some of those recommendations we were learning ourselves. We have the Gansler Commission report. We have the Commission on Wartime Contracting report. And I would say that we've done a great job in the last 5 years of turning ourselves around from where we were in contracting on the battlefield and managing the contractors that are on the battlefield. Developing whole operational contract support construct continues to be one of my priorities.

Now the challenge is that we've done that for the near term. The way I like to term that is: We had a gaping wound. We've sewn that up and stanched the bleeding. But really, the key to success is to embed that in the DNA of the culture going forward. So it's not only about this war now, it's also about having a plan for future contingencies. And there's still some work to be done there.

Priority 3 is life cycle logistics management. How do we embed in the thought process that we need to sustain what we are buying new for the next 30, 40, 50 years, depending on the platform that we're buying? That's pretty important. Thirty percent of the cost of a platform is in its research and development acquisition, while the remaining 70 percent is in sustaining that [product] over its life cycle. It becomes pretty important to buy a weapon system so that it has a lower cost in sustainment. We've done a lot to raise the level of that discussion at defense acquisition boards and within the defense acquisition community.

Equally important to the mix is the development of solid sustainment strategies. Once you've bought it, how are you going to sustain it? There are a number of different ways of doing that, including performance-based logistics [PBL] strategies. How do you do these PBL strategies well? We have a whole area of assessments around that we are working with the acquisition community and the sustainers of that community, to ensure that that's embedded in their thought process.

The final priority is what I'll call excellence in logistics/supply chain. How do we do our business well? How do we increase the capability of our tradecraft in that area? Improving our processes increases military capability. If you are sustaining a force on the battlefield well, you are freeing up capability to do other things. Although we didn't start off as well as desired, we've performed exceptionally over the last number of

years sustaining and moving the force in Afghanistan and Iraq. Nonetheless, there are things we could do better.

And then just in the general industrial base side of it, the normal business of the Department—again, there are processes we can do better to both increase our capability and lower our costs. Lowering our costs is important in this environment. If I can take cost out of the logistics business area without decreasing capability, I'm freeing up dollars for other requirements inside the Department. I think that's important.

DAT&L: *Can you discuss opportunities DoD is leveraging to share technology and resources in new ways?*

Estevez: Joint strike fighter is obviously a coalition platform, but there's some work to be done there. We're looking at joint capabilities inside the Department. For example, when we look at our depot structure, how do we optimize our depots to ensure that they're getting the right workload at the right depots across the joint community, versus Service-specific? We just did a major assessment in the UAV area, where we're targeting specific depots to do that workload. So instead of scattershotting that capability (because every Service has its own UAV capability because of mission sets), if we develop capability in Depot X, why can't Depot X do that for the joint community versus one particular Service? That'll give us some savings.

We're leveraging, of course, DLA. We just did an assessment called strategic network optimization, which has the potential to provide DoD with a couple of hundred million dollars over the FYDP [Future

Years Defense Program] return on investment—just by managing the distribution process and the network around that better. And I'd say that's a down payment; there are more efficiencies to be gained in that area.

DAT&L: *Can we use working capital funds for reliability upgrades?*

Estevez: Depends on how you bought the platform and how you're sustaining that. So if a working capital fund happens to be paying the performance-based logistics on a contract and the PBL contract on component X includes reliability upgrades, sure. But in general, reliability upgrades tend to be paid out of procurement accounts.

DAT&L: *How do PBL contracts impact Service force structure and design?*

Estevez: There's a range of how PBL contracts operate. We just did a study called ProofPoint [*Editor's note: See the March-April 2012 issue for an article about this study.*]—two iterations

The key to success is to embed that in the DNA of the culture going forward. So it's not only about this war now, it's also about having a plan for future contingencies. And there's still some work to be done there.
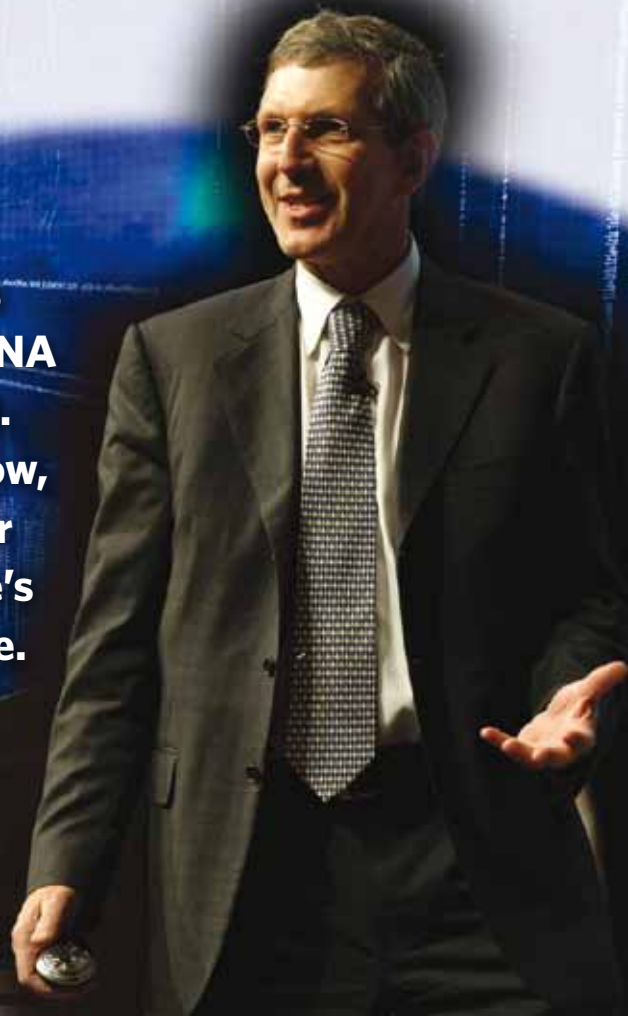
of it—that did deep dives into a number of programs. Some of them show real benefit; others had some problems. But in general, if you look across the continuum of contracts, a well-done PBL contract can save dollars or increase readiness or, in the best of cases, both.

Now with that said, they're not the easiest contracts to develop. So you really need A-team contracting officers, A-team sustainers, and A-team program managers to develop the right contract construct for what it is you're putting under a PBL contract.

I'm not sure a PBL contract changes force structure, though it could change how many people you need sustaining an item out there on the battlefield—or back in depot, for that matter. I don't know that we've changed how many X platforms as a whole that we buy. For example—if we buy joint strike fighters, we buy against a threat and a need. Theoretically, if I could really guarantee X percentage of readiness, I would buy less. I don't think we're quite there yet in changing the dynamics, but

we certainly could say that what we have done will increase the readiness while decreasing the capability needs to sustain that readiness against a particular platform.

DAT&L: *Should OSD drive the alternate-fuel development or let the commercial sector drive and we follow?*

Estevez: Well, let's start out [noting] that industry is who is out there developing alternative fuels, not the Department. It's not work that's being done in our labs; it's being done in the commercial sector. The Department definitely has a role, as long as there's a link to military value of putting dollars against capabilities—in this case alternative fuel—that can help jump-start that tool [or] technique.

The general thought process on alternative fuels would be that they would increase the overall supply of petroleum product. That does two things: It can lower the cost of the product. Petroleum is based on a worldwide marketplace and is a fungible product. It could [also] increase U.S. security. Both those things are in the Department's interest. So the Department putting some dollars against alternative-fuel capability makes perfect sense.

DAT&L: *How does OSD balance modernization with reset using overseas contingency operations [OCO] funds (or otherwise)?*

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Estevez: The basic rules say that OCO is not to pay for modernization; investment accounts are to pay for modernization. With that said, there are upgrades that are going on the battlefield for needs right now, today, that OCO is paying for. So if I upgrade an MRAP with an underbelly kit, increasing its capability to sustain a blast and protect its riders—that would be viewed as modernization. That is paid for out of OCO. But if I'm going to do Apache Block III, that portion of it would be paid out of investment accounts.

DAT&L: *Will OCO budgets be rolled into O&M?*

Estevez: Well, OCO is not just O&M. There is OCO that pays for investment, OCO that pays for R&D—JIEDDO [Joint Improvised Explosive Device Defeat Organization] work, for example—that turns into a real capability back on the battlefield today, which is what OCO is designed to do—to sustain the fight that we're in.

Obviously, there are pressures on budget as a whole, including pressures on the OCO budget. And as we complete our mission in support of contingency operations, OCO budgets will decline—not necessarily—and hopefully not, in fact—as a one-to-one. Because there's a requirement after we draw down in Afghanistan—I can't predict what the force structure in Afghanistan will be post-2014. We recently signed a security agreement with the Afghans that calls for a U.S. and Afghan partnership post the 2014 drawdown of combat operations in Afghanistan. And how that will be paid for—that's a prediction I'm not prepared to make.

But I do know that as equipment comes out of Afghanistan, it will need to be reset. Equipment doesn't exactly come out as the force comes out, and our hope is that there are OCO funds available to pay for that reset. We all know that there's a bill to be paid after the fact. Again, I cannot predict how the budgets will transpire in Congress during the 2014, 2015 timeframe.

DAT&L: *What is the vision of logistics and our posture in the Pacific? Are there any specific initiatives?*

Estevez: A couple of things I will say: The Pacific is pretty large. That makes logistics: 1) important and 2) harder to manage. Now again, we just did logistics in two wars, one of which was in a landlocked country. Most people forget that based on the president's decision in February 2009, we deployed a couple of brigades (20,000 people) throughout that year. Additionally, when the president said to surge forces in Afghanistan in December 2009—increase the force by 30,000—U.S. TRANSCOM and CENTCOM worked through the numbers. TRANSCOM essentially said, "You can't fit any more equipment or materiel into the flow pattern in order to close that force by August of 2010." Yet we managed to put in 7,000-plus MATVs into that flow pattern.

So logistics is capable of incredible agility and flexibility. And that's again because of the great logisticians out there on the battlefield, the great work of TRANSCOM, the military Services, and the Defense Logistics Agency, in doing that.

So in talking about the Pacific: We do have a logistics laydown in the Pacific; it's not like we are just suddenly going there. Obviously, we have forces in Korea today. We have forces in Japan today. One thing that will happen is our forces—certainly Marine Corps forces—will be more dispersed. We'll have to look at that dispersion in relation to our mobility requirements. We're about to do a new mobility-requirements assessment, based on the new force structure. The last one was done on a force structure that had the Army and the Marine Corps at 100,000 more people than they will have in the future force structure. So that changes the mobility requirements right there.

But increasing dispersion of the force structure will require some mobility requirements to cover that slack. Between our force of C-17s, modernized C-5s (and we're increasing the capability of the C-5B fleet, being changed into C-5Ms)—also our C130s and our CRAF [Civil Reserve Air Fleet]—our contingency airlift fleet, which is commercial carriers that we rely on—my expectation is that given the numbers, we'll be able to sustain the force laydown that we have in the Pacific, but we'll see what happens as we do this study.

DAT&L: *Do you have any thoughts about the relationship of DLA and TRANSCOM and possible merger?*

Estevez: They have a great relationship! First of all, if you're going to talk about this, you probably cannot limit it to TRANSCOM and DLA; they are two components of the logistics structure. Merging the relationship of those two really is a piece—and I don't think it's the biggest piece, frankly—of the logistics structure. I think that the relationship of TRANSCOM and DLA is great. TRANSCOM and DLA have different missions. They have different focuses. They work very well together in sustaining the force on the battlefield.

If you start looking at DLA: DLA probably buys about 80 percent of the materiel for the Department—I'm talking about repair parts. It increases when you include food and fuel, which they are able to provide in a lot of different places. Food and fuel are provided all over the world. However, it is important to note that while DLA buys about 80 percent of our repair parts, the military Services buy the remaining 20 percent; that 20 percent is actually 80 percent of the value of the inventory, which for the most part, are readiness drivers. So they are as

much in the mix as DLA and TRANSCOM when you start talking about sustaining the force on the battlefield.

And here again, we are showing that we do it. DLA is all over the battlefield today, doing distribution capability, doing food, fuel, support capability, doing disposition. DLA cuts up battle-damaged equipment, turns it into scrap. All that is being done on the battlefield today by DLA. None of what I just talked about, except for the distribution piece, is in TRANSCOM's mission set. And I don't think TRANSCOM's looking for that mission set. And when you really look at DLA, it's about a $42-billion-a-year buying agency with about $3 billion or $4 billion of distribution depot operations rolling in on top of that.

DAT&L: *Speaking of depots: One NDU student asks: If I put a dollar into a depot, how do I get a dollar of readiness?*

Estevez: First, let me just say our depots do some great work. We are probably over capacity in the depot structure. We will be reviewing that, and if Congress authorizes a BRAC, we'll definitely be reviewing depot structure. But the depots do a great job. If you put a piece of equipment into the depot, you are going to get a great piece of equipment out on the other end of that. When you start looking at depots, you start looking at the overhead structure behind them; there's a cost to doing that. From a pure touch-labor standpoint, depots are as competitive as any commercial entity out there in doing that.

So when I talked earlier about supply-chain excellence, you have to look at it in the total. It's not just the depot operations. You have to look at the logistics system that sustains that depot, both the commercial industry piece of that and the organic piece of that, to determine whether you're achieving value. In general, I'd say yes. But could we do better? The answer is also yes.

Now let me just add another thought: When you start talking about this mix—in our earlier discussion about PBL, many of those are done under depot partnership arrangements. But it's also important, as we compress

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spending inside the Department based on our budget requirements, that we sustain a vibrant industrial base. Dr. Carter has been quoted as saying that when we decide to buy a new airplane, a new combat vehicle, a new truck, a new ship, we go to the commercial sector to do that. We do not have that capability inside the Department of Defense. So it's important to have those people out there when it comes time to do that. And it's not just the company, who you might go to in order to buy that equipment. It's the second-, third-, fourth-tier suppliers we also rely on, on the sustainment side.

So it can't be all about the organic structure. It has to be about the industrial base and the organic structure at the optimum mix to achieve optimum results of readiness and optimum results of investment, through procurement, for the dollar spent by the Department of Defense.

DAT&L: *Another question is about the Afghanistan drawdown, which you discussed earlier.*

Estevez: Let me just give you a couple of thoughts about why Afghanistan is going to be so much more challenging than Iraq. In Iraq, we had Kuwait there as a great base of operations. Kuwait has great port facilities. The Kuwaiti government let us operate [Army Camp] Arifjan on their soil and some other sites, so that we were able to bring forces in, set them up, get them trained, send them north—the same capability was there in turning that around to redeploy back. Plus we had logistics forces in Kuwait that were able to do a big piece of the drawdown. We do not have that same capability in Afghanistan. There is no Kuwait as a "catcher's mitt," where you can move all this equipment to and do wash racks and prep capability before you move it back to the States.

Afghanistan is a landlocked country, and it has a road network that is nowhere near the road network of Iraq. We're still in contact with the enemy in Afghanistan. Right now we have one or more main routes into Afghanistan shut down in both directions. That would be our main route for ground movement out through Pakistan. My expectation is routes will open up at some point—not entirely sure when.[*Note: Pakistan re-opened these routes in July 2012.*] Northern distribution routes, which have been fabulous for our sustainment mission in Afghanistan—we really haven't exercised them for retrograde. We are starting to do that. It will take a while before we hone the practices of that; this includes multiple border crossings of the Central Asian states, plus Russia, plus the Baltic States. It will take a while before we get flow really going either through the northern distribution network or through Pakistan, whenever Pakistan and we reach an agreement to reopen the routes through Pakistan.

And of course, we are flying equipment out. We can do that with all those multimodal capabilities, and TRANSCOM is running some operations to do that. But all in all, it's going to be a pretty difficult operation. And it's not about moving people; it's about moving equipment. And moving people is also more complex in Afghanistan than it was moving them out of Iraq.

DAT&L: *Is someone looking ahead at any "leapfrog" technology for OSD and ERPs?*

Estevez: The question is pretty broad. I'll hone it back to the IT portion of that. Obviously, our R&D structure and the Service labs are certainly looking at next generation technology. And DARPA—its business is looking at next-gen technology. And obviously, we are going to start looking at the grid and the infrastructure on that, how to utilize cloud, and where the commercial sector is advancing—all that's going to play into the Department's strategy.

From an ERP [enterprise resource planning] perspective and an IT perspective, the Department does not do IT well. I wish we would do it better. Each of the Services has made some major investments in ERPs over the last 10 years. Most of those are going to come into fruition in the next couple of years. Some of them are already operating.

We need that to happen for a couple of reasons: One, for all those things I talked about in supply chain excellence and lowering costs: ERPs give you great capability to look holistically in that regard. And I think we're going to see the benefits of that in the coming years. So it's not just about ERPs; it's about the business process that you put in behind that as well. Some Services are not as advanced as others, and there will be problems.

Second—and we do have a major focus in the Department given that the Secretary has emphasized this and actually put goals on it—is auditability. We do have a legal requirement to be auditable. The government as a whole—the Department is going to be the last Cabinet Department that has a clean audit statement. ERPs are a foundation to help the Department have a clean audit and track equipment on the books; frankly, I think the American taxpayer expects us to be able to track our books.

DAT&L: *One DAU dean asks: OSD Log was at the human capital forefront a few years ago by issuing the DoD Logistics Human Capital Strategy in 2008. What have we learned about leading our talent, and what can DAU and our stakeholders do to help further this initiative?*

Estevez: I'll talk about log as a piece of that. Human capital is critical, obviously, across the Department—not just in the log area, but you can name an area, and there are little fiefdoms in some of these areas of the acquisition workforce. And we have a major emphasis on growing and increasing the skillset

of the acquisition workforce—something that DAU is in the forefront of, on the acquisition side, of course. A sliver of the log workforce is acquisition workforce; the bulk is not.

Cyber is a growing area. Medical capability—the Department's done some great work in the medical capability for the forces that are coming back that require that. I had an opportunity to visit Walter Reed, and observed the incredible work that we are doing to help our wounded warriors that are coming back. That will actually come out into the public sector as we grow those capabilities.

From the log workforce, what we did a couple of years ago is we asked, what are the skillsets needed? Then we stood up at NDU the Center for Joint and Strategic Logistics—that Lt. Gen. (retired) Chris Christianson is heading up for us. Chris has gone out and looked at a number of different courseware in the public university sectors and what we teach in the military university system and has identified some training capabilities that we need to increase.

So it's a mixed area on how you do that—how you build the right logistician. So there's great university capability out there. We send people to the universities I mentioned to ensure that the right skillset is developed. It is also critical that we make sure that our military courseware keeps pace with the commercial sector.

DAT&L: *You mentioned areas where you think there could be more logistics training, that Lt. Gen. Christianson is looking into—*

Estevez: Well, he's looking at a couple of things in both the supply chain area and the joint military education area. One that he likes to talk about is assigning a junior major as a planner on the joint staff with no joint experience. So what has been done to build that officer? And that's some of the areas

that he's looking at. I will always raise the point that you need to do that in the civilian workforce as well.

Then I go back to the question of: How do I build someone who understands what good supply chain management looks like? So if I'm going to make our depots and our supply chain that sustains those depots into a cost-effective operation, as well as an effective operation, we need to fix those capabilities. There's understanding how commercial supply chain works; there's understanding how the industrial base operates.

It's both experience and education that get people to understand that capability, so that when I have a supply planner at Defense Logistics Agency, he really needs to understand how that commercial supply chain operates that he's buying from, if he's going to buy well. If I'm going to have that sustainment operator who's going to plan how I'm going to sustain joint strike fighter, or LCS or JLTV or ground combat vehicle—it's not just how does Boeing or Lockheed or BAE or Northrop do it. It's understanding their supply chain. How does that operate? So having that background and knowledge is value-added when developing sustainment contracts or framing a performance based logistics contract. It is critical that we understand where we have the best leverage and how we can strike the best deal. The mix of skills that I just went through: Contracting, acquisition, logistics all need to be in play there. If we're going to operate in a constrained-resource environment, having the appropriate tradecraft and the skillset is the only way we are going to achieve great support. I think it is important to focus on that.

DAT&L: *Mr. Estevez, thank you very much.*

Estevez: My pleasure. &

Special thanks to Vice Director George Topic of the Center for Joint and Strategic Logistics, National Defense University, Ft. McNair, Washington, D.C.

MDAP/MAIS Program Manager Changes

With the assistance of the Office of the Secretary of Defense, *Defense AT&L* magazine will, beginning this issue, publish the names of incoming and outgoing program managers for major defense acquisition programs (MDAPs) and major automated information system (MAIS) programs. This announcement will list all such changes of leadership, for both civilian and military program managers.

For April–June 2012
Capt. Donald R. Harder (USN) relieved **Capt. Steve J. McPhillips (USN)** as program manager for the Command and Control Program (PMW 150) on May 16, 2012.

Capt. William S. Dillon (USN) relieved **Capt. Michael T. Moran (USN)** as program manager for the Maritime Patrol and Reconnaissance Aircraft Program (PMA 290) on May 29, 2012.

Capt. John S. Lemmon (USN) relieved **Capt. Shane G. Gahagan (USN)** as program manager for the Hawkeye, Advanced Hawkeye, and Greyhound Program (PMA 231) on May 29, 2012. &

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A project of Acquisition, Technology and Logistics, Defense Research and Engineering, Defense Technical Information Center, Networks and Information Integration and Department of Defense Chief Information Officer, and Rapid Reaction Technology Office

Assets

Mission Command Battle Lab Science and Technology Seminar

with the

Command and General Staff College

Improving Army Systems Development through Early, Experienced User Involvement

Jeffrey D. From ■ *Brett R. Burland*

The U.S. Army has long implored acquisition personnel to involve users early and often in the process. An annual event held by two Army organizations has been successful in bringing technology developers and the potential users together to exchange ideas.

The Army Mission Command Battle Lab (MCBL) and the Army Command and General Staff College (CGSC), both in Ft. Leavenworth, Kan., created the Science & Technology Seminar-Brownbag Lunch Program in 2010 to expose CGSC students, faculty, and staff to mission command-related R&D systems and products, while giving developers feedback on their work. The 2-day seminars includes static displays and demonstrations on day one and a formal brown-bag lunch session and demonstration on day two. The schedule is closely coordinated with the CGSC leadership to ensure student availability and maximum

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participation. Additionally, the MCBL makes every attempt to synchronize the products being demonstrated with the CGSC course of instruction (e.g., handheld technologies are demonstrated during brigade operations). The event is a venue in which developers from across the Army's R&D community receive feedback from experienced leaders and from the many multinational and sister-Service personnel attending the CGSC. Conversely, the students who participate in the seminars expand their experience base and are better prepared when the new technologies arrive in the field.

The MCBL, with support from the CGSC, executes two to three seminars each year, soliciting operational feedback from CGSC faculty, students, and staff. The CGSC provides intermediate level education (ILE) for Army and sister-Service officers, interagency representatives, and international military officers. The ILE course of instruction is a 10-month, graduate-level program; the curriculum includes instruction on leadership philosophy, military history, and the military planning and decision-making processes. There are two ILE classes per year; the first begins in August and ends in June, and the second begins in March and ends in December.

With the exception of two 2-month periods, there are at any time approximately 1,400 CGSC students (Army, sister-Service, and international) completing the CGSC instruction. Given the current operational environment, the average CGSC Army major has deployed three times to a combat zone. A more experienced and expansive population does not exist anywhere else in the Army. This and the genuine need for broad operational input to S&T development work were the key drivers to the program.

The MCBL sponsors and is involved in a number of S&T development efforts. With the large number of S&T projects across the government, academia, and industry, it is possible for the MCBL to target and sponsor the MC technologies with the greatest potential to fill the key capabilities gaps and technology shortfalls identified by evolving documents, such as the *Mission Command Capabilities Based Assessment* (CBA), *Program Executive Officer Technology Transition (T2) Matrices* and other Joint Capabilities Integrated Development System (JCIDS) documents, such as the Net-enabled *MC Initial Capabilities Document* (Net-enabled MC ICD). All these documents describe capability gaps, while the Net-enabled MC ICD and the *Mission Command Essential Capabilities* (MCEC) *Document* highlight the most critical ones. In an average year, the MCBL participates in approximately seven S&T projects. In most, the MCBL provides comprehensive operational input and oversight.

One of the most technically diverse seminars was in March 2011. It highlighted technologies under development by the Defense Advanced Research Projects Agency (DARPA) and the Army Research, Development and Engineering Command (RDECOM). RDECOM developed a prototype handheld application and demonstrated just a hint of the power of augmented reality (AR). In this tool, the RDECOM developers leveraged the highly successful tactical ground reporting (TiGR) system database, rendering symbols and key operational information on a handheld (Android) device. The CGSC officers could see a display of notional TiGR events (e.g., IEDs, targets, and key terrain) close to their location, overlaid on the screen and indicating general information and geo-location of the events.

The application leveraged the internal capabilities of the handheld device, including the forward-looking camera and the global positioning system (GPS). In operation, the AR screen simply looked like a window highlighting whatever was in the field of view of the camera (where the device was pointing) and those TiGR events within a specified range of the application. During the demonstration, CGSC officers were allowed to use the handheld device and offer their thoughts. Even though this research was immature, it exposed Army officers to one possibility for enhanced and timely situational awareness at the lowest tactical levels.

"We work hard to engage soldiers on our R&D efforts at every opportunity, but receiving input and feedback from experienced Army officers can be challenging for us," said Cyndi Carpenter, the COBRA ATO manager for CERDEC's Command, Power and Integration Directorate. "The relationship the MCBL has built with the CGSC and initiating the S&T Brownbag Lunch program is certainly a great use of the wealth of operational expertise on Fort Leavenworth. Our programs are, and will continue to be, better for it."

A second technology demonstrated at the March 2011 event focused on a two-way, speech-to-speech translation system called TRANSTAC. It had the capa-

bility to translate Pashto, Dari, and Iraqi Arabic to English and vice versa. The TRANSTAC device was developed in response to a need from Army units. Soldiers at checkpoints and out on patrols required the ability to better communicate with the local population. TRANSTAC offers a unique capability to quickly break down the language barrier. Soldiers can speak into the device in English and within a few seconds, both oral and written Pashto, Dari or Iraqi Arabic is relayed to the recipient. It can also do the same translation from verbal input from any of the three languages and provide audible and written translation in English.

TRANSTAC worked very well; at one point, an Afghani CGSC student did an impromptu demonstration of its ability to translate Pashto to English. The demonstration highlighted potential techniques and word usage requirements in situations where warfighters encounter individuals using different dialects, as well as the need for being prepared if the translation is incorrect.

The participants were particularly interested in the TRANSTAC product, and the CGSC officers were able to see firsthand an S&T product already being used in theater. At the time of the demonstration, DARPA and the Army had fielded 102 of the TRANSTAC devices to a brigade combat team deployed to Afghanistan. TRANSTAC received a great deal of positive feedback during the seminar. In fact, it subsequently received approval as a System Under Evaluation (SUE) at Network Integration Event (NIE) 12.1 and received an evaluation of "field and continue to develop" by the Brigade Modernization Command (BMC) and Department of the Army. Brig. Gen. Randal A. Dragon, commander of the BMC, wrote of the TRANSTAC system: "Machine Foreign Language Translation (MFLT) communicated successfully in foreign languages and was easy to install and use." TRANSTAC is scheduled to transition to the Machine Foreign Language Translation System (MFLTS) program of record. The demonstration helped highlight TRANSTAC's functionality for CGSC officers, it also facilitated feedback and identified areas where additional refinement could enhance the tool.

In the most recent lunch event, the MCBL coordinated with the Program Manager Mission Command (PM MC) to introduce its concept for reducing the numbers of MC systems and providing MC capabilities to disadvantaged users—the personnel on a staff who are not fielded to an MC system. Called Command Web, it is a key element of the MC convergence strategy for a consolidated web-based environment. Command Web is essentially a framework for housing lightweight web applications called "widgets" that use the Ozone Widget Framework (OWF) environment. A primary benefit is that it allows third-party widget developers to build widgets for a wide spectrum of users and functions—all interoperable. Most importantly, this product complements the Command

Post of the Future (CPOF) by extending CPOF–like capabilities to disadvantaged users through the maneuver widget. It will help to ensure critical situational awareness information is shared with all members of the operational team, including members outside the Army.

During the seminar, the PM MC developers received valuable feedback from more than 50 personnel. Discussions and feedback from experienced soldiers centered on key functionality within the widgets, interface designs, applicability across different computing environments (e.g., command post), and general employment in an operational environment. Given that Command Web was still in development, this feedback was extremely valuable, helping to ensure the fielded product better meets the soldiers' needs.

With the continual evolution of military operations and an ever-changing technical environment, the importance and value of bringing experienced users in early and often in a product's development cannot be overemphasized. The MCBL recognizes and embraces this mandate, reaching out to the largest population of experience soldiers in the Army Command and General Staff College. Through the seminar program, the MCBL is able to solicit input from CGSC students and staff in a non-threatening, volunteer environment, where both the materiel developer/S&T organization and the CGSC student can benefit. The three S&T Seminars/Brownbag Lunch sessions in less than 2 years have demonstrated the value of the program, with hundreds of CGSC officers and staff participating and six significant S&T programs gleaning valuable input for their development efforts. With support from the CGSC, the MCBL will continue to execute this unique program, which serves as a conduit between the S&T materiel developers and the unequaled experience-base at the CGSC. The long-term impacts of this effort are many—from improved products and functionality to reduced life cycle costs. 🖘

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The Fallacy of Quantifying Risk

David E. Frick, Ph.D.

Nearly every article you see in industry and within the DoD literature on the topic of "risk management" demonstrates, advocates, or aggrandizes the attempt to quantify risk. One might think that if risk management was truly a science and uncertainty could be systematically quantified in some manner, then the maturity of the profession of project or program management, as measured by the number of projects or programs that meet cost, schedule, and performance goals, would increase over time. Alas, the profession is not able to make this claim.

A recent article in a professional publication was no exception and prompted this response. The author suggested that a key to risk analysis was "choosing the right technique" of quantifying risk. The weakness in this argument stems not from the assertion that one approach may be superior to another, but rather from the basic assumption

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that risk (arising from uncertainty) in every situation can, in fact, be quantified.

One profession-wide barrier to a more meaningful discussion on this topic is our collective looseness in the use of language. The lack of a common taxonomy serves to exacerbate this barrier. In this same article, the terms "risk analysis" and "assessment of uncertainty" appeared to represent the same concept. They are two distinct concepts. The word "risk" is the feeble attempt by humans to define the ephemeral abstraction of uncertainty as a tangible term. "Risk," as we commonly use the term, is inherently unquantifiable.

Quantitative techniques rely on empirical data, or at least highly defensible estimates. When you discuss the uncertainty of the weather or solar flares, the historical data are sufficient to make assertions that do not cause statisticians to cringe. When you discuss the uncertainty surrounding a first-time, never-to-be-repeated project or a major systems acquisition (MSA) designed to rely on technology that has not reached maturity, germane historical data seldom exist. One is truly in a state of not knowing what is not known. Estimates presented to the Milestone Decision Authority (MDA), based on experience and judgment, do have their value—but the inexactness of most quantitative assessments of the true state of uncertainty surrounding programs makes predictions based on these analyses no more useful than flipping a coin. Estimates may be all we have, but we should not impute to them some characteristic of certainty that does not exist.

Other disciplines, such as the insurance industry and medicine, use the same term to represent concepts dissimilar to DoD's use of the term. The differences are subtle yet critical, and these subtle differences confound us.

In the insurance industry, years, decades, and centuries of historical data give actuaries high confidence in making generalizations of aggregates. While no insurance company can declare honestly that any given man, born in 1955, non-smoker in good health, will live another 23.26 years, it can declare with the utmost certainty that on average, all men in this category will. These actuaries bet their companies' financial health on the ability to accurately interpret a large amount of historical data.

In medicine—in the United States, anyway—drug companies spend billions of dollars annually to gather data. Test populations only number in the hundreds and sometimes the thousands, but thanks to the beauty of the law of truly large numbers—with a sample size large enough, any outrageous thing is likely to happen—we can be confident that properly conducted studies will, in fact, uncover almost all of the unintended consequences of a drug's effects. However, in DoD acquisitions, we cannot be as confident for a very simple reason—relevant historical data for first time, never to be repeated programs do not exist. Yes, we have ample data on programs, in general, but each program is unique, will face unique challenges, and

will involve a unique set of people. The dissimilarities vastly outnumber the similarities.

Pronouncements that risk registers, quantitative techniques, or milestone reviews "reduce the number of risks" demonstrate another fundamental misunderstanding of uncertainty. First, in the current parlance and practice, the term risk "should" be associated with numeric value—a composite of the probability that a specific threat will manifest and the impact of that manifestation. In program management, we are concerned with the impact on cost, schedule, or performance. We all recognize the equation Risk = Probability x Impact—or some pair of the terms potential, likelihood, damage, effect, and consequences. Probability is a number (0.0 to 1.0). Impact is usually visualized as something that can be measured, e.g., dollars (cost); hours, days, or weeks (schedule); or customer satisfaction, quality, speed, durability, mean time between failures (performance). Therefore, "risk" should be defined in terms of one or more specific units.

For example, the result of some event might have an impact of $10,000 plus 4 days schedule slip plus a 10 percent reduction in system performance. Instead, in DoD, we choose to place probability in one of never more than five, overly simplistic buckets—very low (1), low (2), medium (3), high (4), and very high (5); then we do the same to impact. The product of these assignments is a number in the range of 1 to 25. Then, we arbitrarily slice this range into three sections and name them low, medium, or high. Talk about excessive aggregation! Can you imagine an insurance company only offering three premium levels to a population as diverse as ours? Such an approach would not endanger the insurance company, if its client base was large enough, but I suspect that discriminating consumers, at least those in the low risk categories, would shop elsewhere.

Second, while "risk mitigation" may reduce the total number of threats (by reducing probability or impact of a specific threat to zero), what the practitioner usually means is that the value of the risk for a specific post-mitigation threat is so inconsequential that it no longer merits an expenditure of brainpower. Nonetheless, the specific threat still exists and even the highly improbable event does occasionally manifest. Nassim Taleb refers to this as the "black swan" event.

Third, while eliminating a single threat from consideration may have value, if you consider the near infinite number of threats that may affect a program but are not being considered because they are so remote in possibility or simply not known or knowable, suggesting that a specific program faces no more than 10, 100, or even 1,000 "risks" is naiveté.

In the "identification phase" of "risk analysis" (better named threat identification), practitioners are wont to stop identifying threats at some arbitrary point, usually the number of lines that fit on the risk slide in some PowerPoint presentation. Admittedly, there is a point at which the cost of committing threats

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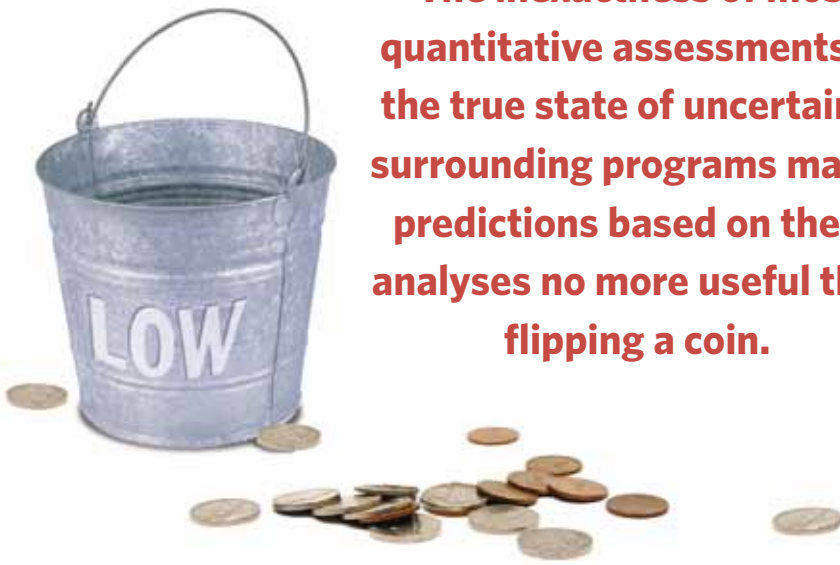
Risk handling and risk mitigation, also terms without precise universally-accepted definitions, are terms commonly thrown about by program management practitioners to justify removing a specific identified threat from the few listed in the risk register. Both PMI and DoD identify four risk mitigation techniques: avoiding (eliminating the threat or consequence), reducing (the probability or consequences of the threat manifesting), transferring (this method is a bit nebulous, but view it as making the threat someone else's problem, e.g., insurance), or assuming (the risk).

Consider, instead, the proposition that from the perspective of the major program, there exist only two categories of action to handle or manage risk:

to paper exceeds prudence. A human extinction-level event (such as a massive meteor strike) would likely have devastating consequences on your project, program, or MDA. This threat always exists, but expending time and effort thinking about it (or reporting it to the MDA) would probably not be prudent. The question is how many low-probability/high-impact threats are not being considered simply because some risk analyst ran out of lines in the risk register or simply failed to identify them?

Furthermore, while uncertainty comprises the totality of possible good things (opportunities) and bad things (threats), invariably, most risk management practitioners only consider the bad things. I laud DoD and the Project Management Institute (PMI) for stressing this point by stating in the *Risk Management Guide to DoD Acquisition*, 6th Edition, and the PMBOK Guide—Fourth Edition, that the objectives of risk management are to increase the probability and impact of positive events and decrease the probability and impact of negative impacts. Nonetheless, in the common parlance, risk continues to be synonymous with the consequences of the negative. For myriad reasons, the discussion of potential opportunities tends to get short shrift.

The issue becomes more absurd in risk averse organizations. There is nothing objectionable to an organization being risk averse, especially in response to the contemporaneous propensity of Congress, but when the analyst allows a conservative trend to influence the analysis of a project's or program's potential success, the program management profession is harmed. Big risk–big reward may be a good cliché for the mission statement, but the culture of the organization will more strongly influence the final risk assessment than the printed strategic plan. High-impact threats are often hidden or ignored. Estimates are viewed through the lens of the best case scenario. The MDA then makes decisions based on information that is incomplete, so more programs fail than anticipated.

- Reduce the composite risk index. This means taking some action within the limits of available knowledge and resources that decreases the probability of a threat manifesting (hopefully to zero) or reducing its impact (again, hopefully to zero).
- Assuming the risk, when probability and impact are both greater than zero.

All actions under the rubric of "risk mitigation" or risk handling fall in this first category. Risk avoidance, e.g., deciding not to start a program, is one manner of reducing the probability of the threat to zero. Risk transfer, e.g., insurance, reduces the impact from the perspective of the program to near zero. To stress the point, risk mitigation "always" has a cost, e.g., expenditure of resources or the ephemeral opportunity costs. Risk mitigation becomes a recursive exercise in cost-benefit analyses. In the end, when all efforts at mitigating risk have been exhausted or evaluated as too costly for the potential benefit and the probability and impact of a specific threat is still greater than zero, the only recourse left is the second category—to assume the risk. Assuming risk should not be considered bad leadership. On the contrary, history is replete with examples of commanders assuming great risk (usually arising from lack of information about the enemy), yet achieving great outcomes.

Attempts at quantifying risk are not, in and of themselves, objectionable. Prudence demands that program management practitioners quantify, to the greatest extent practicable, and prioritize known threats so that limited resources can be applied in a thoughtful manner to reduce the component probabilities and impacts. On the other hand, the practice of stating to some level of surety that, based on some esoteric risk analysis, program risk is low, medium, or high, is damaging to the program management profession. The unexpected, harmful "black swan" event can suggest to those not well schooled in risk management/risk analysis that the

offered analysis was incomplete, incompetent, faulty, or dishonest—not good for the program management profession and replete with consequences, e.g., Nunn-McCurdy reviews.

Practitioners would be much better served to be more complete in acknowledging and reporting the complete state of uncertainty in a project. The output of a complete risk analysis should include:

- The number of threats identified in threat identification
- The number of identified threats for which either probability or impact can or have been reduced to zero
- The number of identified threats for which the composite risk cannot be reduced to zero within current resource constraints and must be "assumed"
- An enumeration of the identified threats for which the organization has no historical experience
- The magnitude of the unknown-unknowns. Of course, this number cannot be quantified, but an honest, subjective assessment is much more valuable to the MDA than is silence. An assessment of project success. Again, this is a highly subjective assertion. Be honest. An honest, subjective assessment is much more useful to the MDA than the typical, overly optimistic, agenda-driven pronouncements.

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Human nature is replete with cognitive biases. Multiple studies have shown how estimates are subject to the confounding influence of expectation bias. A can-do attitude is a great characteristic, unless it blinds the program manager to the obvious truth. Take a step back and have the courage to admit you don't know what you don't know.

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How to Form an IPT

David Hofstadter

Hofstadter, *a Defense Systems Management College professor with over 25 years in DoD and industry, is Level III certified in Program Management and Logistics.*
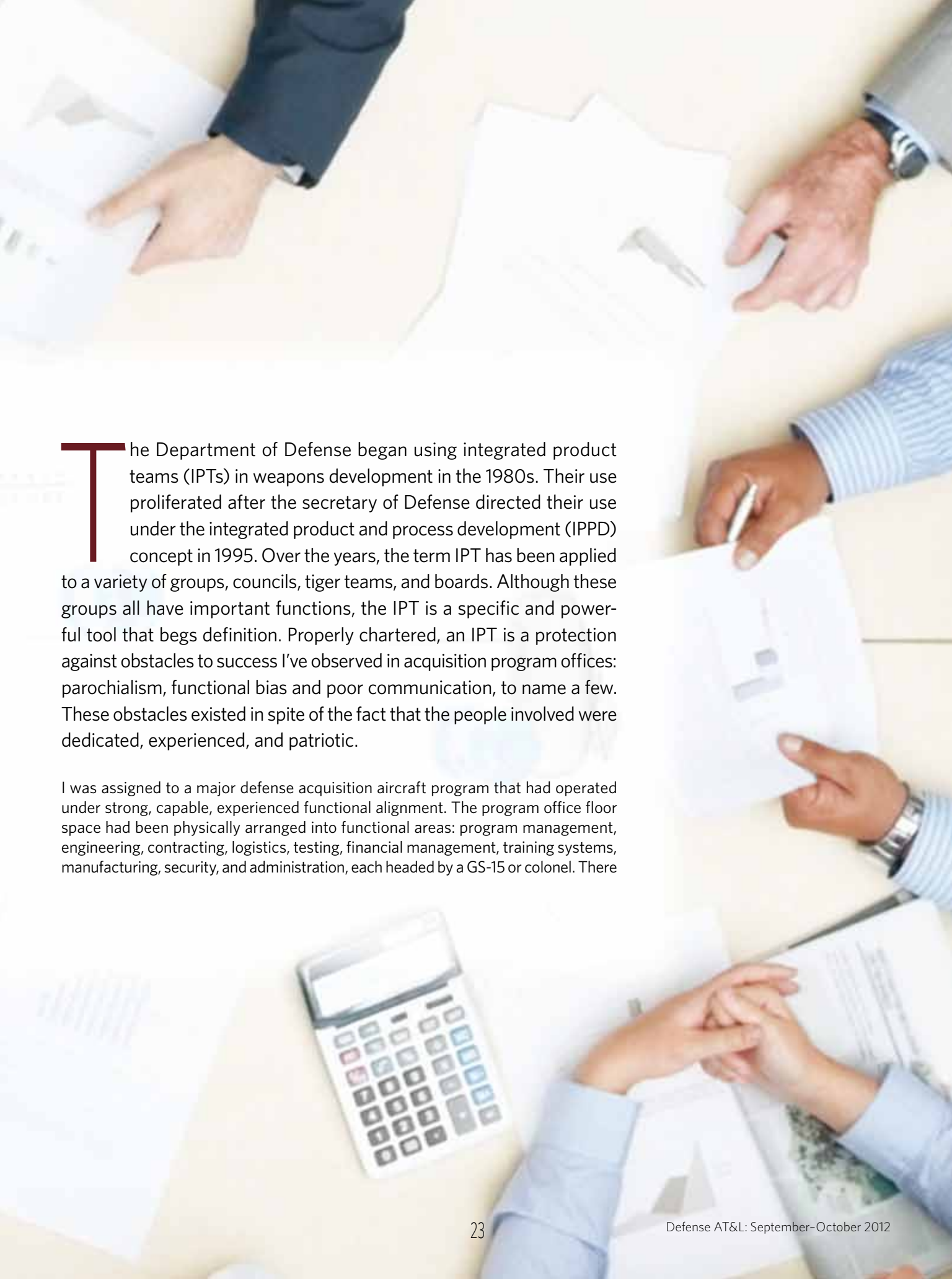
The Department of Defense began using integrated product teams (IPTs) in weapons development in the 1980s. Their use proliferated after the secretary of Defense directed their use under the integrated product and process development (IPPD) concept in 1995. Over the years, the term IPT has been applied to a variety of groups, councils, tiger teams, and boards. Although these groups all have important functions, the IPT is a specific and powerful tool that begs definition. Properly chartered, an IPT is a protection against obstacles to success I've observed in acquisition program offices: parochialism, functional bias and poor communication, to name a few. These obstacles existed in spite of the fact that the people involved were dedicated, experienced, and patriotic.

I was assigned to a major defense acquisition aircraft program that had operated under strong, capable, experienced functional alignment. The program office floor space had been physically arranged into functional areas: program management, engineering, contracting, logistics, testing, financial management, training systems, manufacturing, security, and administration, each headed by a GS-15 or colonel. There

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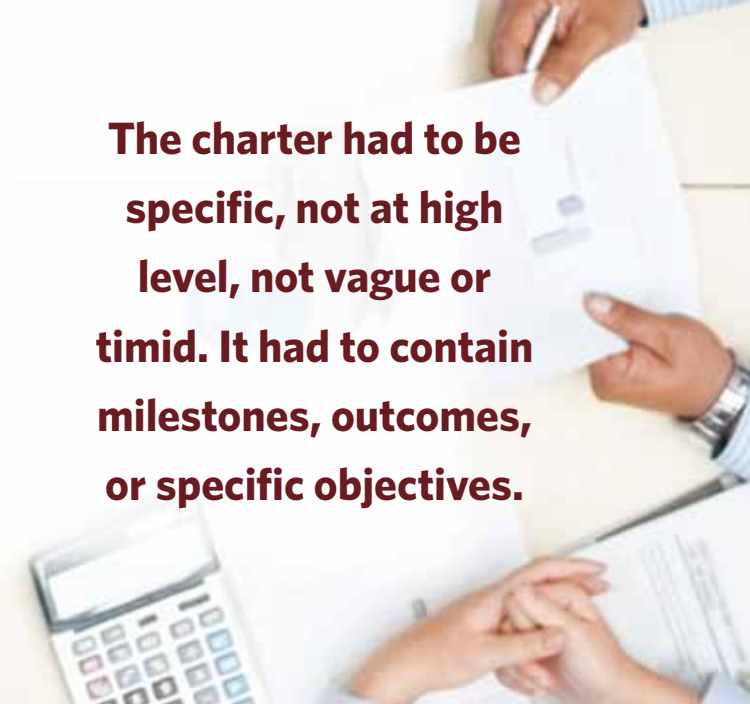
were SES-level functional heads at the base level to which these functional chiefs, and those in other program offices on base, reported. There were also user representatives from the combat commands on base.

When a major issue, such as a proposed design change, arose in the program office, each functional chief would assemble his functional team and formulate their best position on the issue. Each functional position then would be presented in a staff meeting to the program manager, who would eventually make the decision on how to proceed. Next, the deputy program manager and chief of contracting would travel to the prime contractor to present the decision. One of the user reps would check back with their combat command headquarters. The program manager ran the program by being the arbiter among valid but competing positions among his functional chiefs, sorting out issues at his level.

I was assigned to the program office about the same time that a new program manager, a general officer, was assigned. The general quickly became overwhelmed with having to determine the best direction for the aircraft program while being faced with conflicting recommendations from his functional chiefs, often in areas where he had little experience himself. He sensed that program decisions had been made in the past based on the strength of arguments and personalities. He believed this was not always the best balanced approach for the airplane program overall, nor the most efficient application of the program office expertise. The program manager had just come from a base that had undertaken a base-wide transformation to IPTs in their program offices. This had involved extensive training, but it had paid off in efficiency and effectiveness, and he determined it was time it install IPTs in his program office.

At first there was some unease with the program manager's IPT initiative, but that diminished as the functional chiefs

each volunteered to lead an IPT. That is where things got interesting. The program manager was firm that IPTs would be chartered by him to manage or produce a product, such as a test plan or engine, or a major subsystem. Rather than be an engineering team or contracting team, the IPTs were to represent a product, not a function. There would be no engineering solutions or logistics positions or testing imperatives. There would only be a team solution for the product, balancing all functional inputs at the working level. The IPT organization would replace the functional organization process of handing off a product from one stovepipe to another—from engineering to manufacturing to logistics, and back again.

He expected his functional chiefs to take on a new responsibility. They were to help him identify key products or areas in the weapon system that needed an IPT. The manning demand for IPTs required they be few as possible in number and cover major products. They didn't need a seat cushion IPT. They were to then help write a charter for each IPT. Then identify members from each functional discipline needed on the IPT. Next, the functional heads were to empower the members they put on an IPT. No running back to the chief engineer for mother-may-I. And there was no space for observers, only necessary contributors. (I am reminded of a senior acquisition official who said she only wanted members on her team who would lose their jobs if the team failed. The message was no hangers-on, no observers, and no kibitzers.) The IPT concept was decision making and execution at the lowest level.

The program manager expected some resistance. He remembered at his previous base the IPT concept had required buy-in from the senior functional heads on base, and the senior officers at the base. So he met with each senior stakeholder on base. He explained to the senior leaders something that he had discovered. The program was in trouble, but no one was accountable. The best example of the trouble was the test schedule for the electronic countermeasures (ECM) system was not being met.

The logistics functional group would not agree to allow testing to proceed until the important maintainability features were included early in the test schedule. The engineering group stated that testing must be held up until certain engineering questions were worked out. The testing organization was not willing to proceed until all testing criteria met their developmental testing objectives. The program manager pointed out that in this example—and there were many others—there was validity to each position. But there was no one accountable for the product, in this case, the ECM system.

He viewed the responsibility of each senior head to be to get the airplane to the warfighter. To do that he would use IPTs and he solicited their help. The senior functional and base leaders agreed to support him, but not without reservations and concerns, and doubts. After some discussion, they agreed to exercise their functional responsibilities by seeing that the

right functional experts were assigned to the right IPTs. They agreed to offer sound balanced processes to their IPT members, but let them manage the products.

Here is what the program manager believed IPTs were and what they were not. The letters in "IPT" have defined meanings.

Integrated means the team is composed of every specialty or discipline needed to deliver the product. I was appointed lead for the ECM IPT. This IPT also needed domain representatives in development, test, manufacturing, contracting, budgeting, integration, deployment, and sustainment. The team included the user and the contractor during all meetings and deliberations, not as an afterthought.

Product means the team is responsible for a product. It is not a review group to monitor progress or a tiger team to address a single problem. The product may be a piece of equipment or a test plan, but a product must be defined. In my case it was the ECM system that would be provided as government furnished equipment (GFE) to the prime contractor to integrate into the airplane.

Team means that the members work for consensus. A team has one leader. I was a leader among peers, regardless of rank or function. Each member had equal say. As leader I did not have a technical or functional responsibility. My job was to see that the team delivered a product that balanced factors from all members, to see the team reach consensus. To operate best the team members are collocated, with their own meeting area.

The first step was to determine the IPTs. The program manager and his functional chiefs decided which major products or components needed direct management by an IPT. Next they took the necessary time to carefully craft a charter for each IPT. The charter had to be specific, not at high level, not vague or timid. It had to contain milestones, outcomes, or specific objectives. The charter had to state the IPT's authority and the next level of reporting for the IPT. The program manager and his chiefs named in the charter an IPT lead whose responsibilities were stated, which did not include any functional responsibilities. Finally the charter was signed by the program manager. Each charter was eventually posted in the IPT's team area.

Next came the naming of IPT members. Each must be relieved of other duties sufficiently to accomplish the objectives in the charter. The chiefs had to assure the approval of the individual's supervisory chain. Finally, the IPT members must be empowered to do what is in the charter.

There are a few tips I learned as an IPT lead.

The IPT leader must:

- Be respected in and out of the IPT
- Be balanced
- Possess managerial skills
- Be able to manage the external environment to allow the IPT to focus on their work
- Be decisive. Make the decision with the best consensus when the decision must be made
- Not be biased toward any functional or technical viewpoint

The IPT members must:

- Have domain or functional expertise
- Be empowered and have authority for their domain
- Be committed to the IPT's product and charter
- Agree on ground rules, time demands and schedules
- Be open minded
- Be a team player

Not every program office will be able arrange all the particulars I illustrated above, but the core functions are achievable. You may not have the luxury of dedicated meeting rooms, but you can schedule common meeting spaces. You may not have all members collocated, but there are ways to still meet together using travel, video teleconferencing, or, as a last resort, speaker phones. The essential requirement is that all IPT members be present at meetings. You may not be able to have (or even need) full-time access to every functional expert called for, but you must push for dedicated identified members, even if part time. Two mandatory members of your IPT—and this is essential—are the user and the contractor. If your IPT is for a GFE component, you need both the GFE vendor and the prime contractor.

There were other tasks the general faced to implement IPTs. The facility manager had to rearrange the cubicles so the IPT members could sit together, and so that each IPT had a meeting area. The head of human resources had to agree to permit each IPT lead to make written input to the appraisals and performance reports of his IPT members, such as by formal letter to the member's supervisor of record.

The IPT was tasked, recognized, and rewarded as a team, not as individuals.

At first there was some uneasiness and mistrust among the IPT members. But as they began to meet and solve problems together I witnessed an interesting phenomenon. They began to achieve successes. Small organizational successes at first, but then they began to tackle and solve bigger challenges. They began to learn each other's jobs. They became able to answer outside inquiries for each other when a member was not available. They began to cover for each other.

IPTs do not arise automatically, or naturally, or spontaneously out of need. Nor are they learned on the fly. They must be worked at to work. There are a variety of people who can and will say no to an idea. IPT members are empowered to say yes.

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An Immodest Proposal
Making a Profit on Defense Programs

John Krieger

F aced with declining budgets and the spectre of sequestration under the Budget Control Act, the Department of Defense must do much more than it has ever done in the past to get more bang for the buck. This is usually translated to mean greater quantities for the same funding. How do we do that?

In 1729 Jonathan Swift wrote a satirical essay, *A Modest Proposal for Preventing the Children of Poor People From Being a Burden on Their Parents or Country, and for Making Them Beneficial to the Publick*, which has come to be called *A Modest Proposal*. In Swift's essay, the "modest proposal" was for the Irish to raise themselves up from poverty by selling their children as food "... to the persons of quality and fortune through the kingdom." As that title was already taken, we have called this piece An Immodest Proposal which next to Swift's this is very much so. The other choice would have been A Truly Modest Proposal, which this certainly is.

If Only DoD Operated as a Business

In Breaking the Camel's Back (*Defense AT&L*: July–August 2009), Roy Wood and I took exception to a statement in a 2008 report from the Defense Science Board, "DoD's business practices need not be worse than the

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commercial sector's norm." It was that statement that broke the camel's back, as far as we were concerned. We wrote:

> If the Department of Defense could operate more like a commercial business, weapons systems would be cheaper, on time, and meet the needs of the battlefield commanders. That is a recurring theme in the dozens of acquisition reform studies over the past several decades. Most recently, a Defense Science Board report noted almost wistfully that DoD should adopt "commonplace tenets of good management practice that abound in the commercial sector" (Defense Science Board 2008 report, "Defense Imperatives for the New Administration"). While no one we know has the chutzpah to defend many of DoD's more notorious business blunders, comparing DoD with commercial business is a faulty analogy. While "making DoD work more like a business" makes for a good sound bite, it grossly oversimplifies the situation and can inadvertently drive discussion away from realistic solutions. To apply a quote from H.L. Mencken: "There is always a well known solution to every human problem—neat, plausible, and wrong."

We went on to argue why the Department of Defense is not like a business, and should not be expected to operate as one. However, the country as a whole, and the Department in particular, are facing dire financial straits. We must now explore every nook and cranny to find ways to help ends meet. Where Wood and I had argued that the Department had no profit motive to drive its behavior, we must now create that profit motive, or something that can stand in its stead.

Making a 'Profit' from Department of Defense Programs

Let's begin with a discussion of profit. As we're in the business of acquisition, let's look to the Federal Acquisition Regulation (FAR). Interestingly enough, the FAR does not define "profit," so we must look elsewhere. According to *The Government Contracts Reference Book*, profit is "The amount realized by a contractor after the costs of performance (both direct and indirect) are deducted from the amount to be paid under the terms of the contract." For the Department of Defense, it would be something like, "The amount realized by the Government after the costs of performance (both direct and indirect) are paid." Now in the best of all worlds, that would be something to achieve. At a lesser level, if the Department could just defray even a small percentage of program costs through recoupment of expenditures, we would be much better off.

Now, "recoupment" is a word defined in the FAR. According to FAR 35.001 Definitions, "Recoupment," as used in this part, means the recovery by the Government of Government-funded nonrecurring costs from contractors that sell, lease, or license the resulting products or technology to buyers other than the Federal Government.

And that, ladies and gentlemen, is what this article is about, only more so. I would argue that where we can, we should not only recoup the nonrecurring costs, but also the recurring costs. In fact, we should go one step further, to the degree that selling, leasing, or licensing the resulting products or technology to buyers other than the Federal Government recoups all Government-funded nonrecurring costs and recurring costs, and there are additional sales, leases, or licenses, the Government should take a percentage of those and either return the money to the Treasury or use to defray the cost of other Government programs. Such bold an approach would require legislation, as the law and 32 CFR § 165.6 require, "Recovery of nonrecurring cost recoupment charges shall cease upon the recovery of total DoD costs."

Getting Our Money's Worth

At this point you are probably skeptical about the possibility of such a fantastic construct being viable. Let's explore one example and see, the Global Positioning System (GPS). (Admittedly, it may be one of the easiest examples.) At this time, the Department, through the Global Positioning Systems Directorate, acquisition office for developing and producing GPS satellites, ground systems and military user equipment, is pursuing the future of GPS. This is being done through contracts with the Boeing and Lockheed Martin. Boeing has contracts for development and production of 33 GPS IIF space vehicles (SVs). The first GPS IIF was launched on May 27, 2010. In May 2008, Lockheed Martin was awarded the first GPS III increment contract, for the development and production of two initial SVs, with options for up to ten additional SVs. All of that has got to cost a lot of money. How much? Well, according to Coleman Bazelon of The Brattle Group, Inc., "The Federal government has spent an estimated $35 billion on the current GPS network since it began GPS operations in the mid-1970s." How do we get that back? Or pay for the next GPS constellation?

Let's look at what we might be able to achieve in the future, if we were to go about things smartly. GPS is big business, really big. Although the first thing that comes to mind about GPS is navigation, GPS is ubiquitous, even reaching into areas such as banking and invest-

ments, through computer clock synchronization. Wikipedia lists a myriad of civilian applications for GPS (i.e., clock synchronization, cellular telephony, disaster relief/emergency services, geofencing, geotagging, GPS aircraft tracking, GPS tours, map-making, navigation, phasor measurements, robotics, recreation, surveying, tectonics, telematics, fleet tracking). That's a lot of applications, and there are billions of dollars associated with those applications. Just think of the number of users for a single application. According to a June 2010 column in *Information Week*, "The number of traffic information users globally is expected to grow to more than

Twenty years ago, AM General was able to commercialize the M998 High Mobility Multipurpose Wheeled Vehicle (HMMWV), the "Humvee." Later owned by General Motors, the line included luxury 4x4 vehicles, sport-utility vehicles (SUVs) and sport-utility trucks (SUTs). Now, think about all the vehicle developments that have been going on, or are ongoing, in the Army and the Marine Corps as a result of years of war and the ongoing reset.

Or think about the ongoing development of unmanned aerial vehicles (UAVs), both fixed-wing and rotary-wing, which have

> **Suppose that each of those 370 million traffic information users had just $10.00 added to the purchase price of their device...a relative drop in the bucket, but multiplied by 370 million is equal to $3.7 billion.**

370 million by 2015, up from 57 million this year, according to new data from ABI Research, which also found that traffic information remains the most important feature of mobile navigation services."

Now, do some simple math. Just suppose that each of those 370 million traffic information users had just $10.00 added to the purchase price of their device, transparent to the purchaser. A relative drop in the bucket, but multiplied by 370 million is equal to $3.7 billion. Or, a single dollar added to a monthly phone bill for each of the 327,577,529 wireless subscriber connections that CTIA-The Wireless Association says there are in the United States. (Note: That number exceeds the population of the United States.) Multiply $327,577,529 a month by 12 months, and you get $3.9 billion a year. Now add the two numbers we've calculated, think about potential recoupment from other application errors, and, voila, we have a new GPS constellation in no time. As Sen. Everett Dirksen is reputed to have said, "A billion here, a billion there, and pretty soon you're talking real money." This sort of recoupment could easily be administered in the same way as the excise tax on gasoline and diesel fuel or sales taxes.

Low-Hanging Fruit and Higher-Hanging Fruit
Admittedly, GPS represents a target that is easily achievable, and which would not require a lot of effort (i.e., low-hanging fruit). However, there are many trees in an orchard, and even if some of the fruit might be somewhat more difficult to harvest, it could, ultimately, be worth the effort.

come a long, long way since the original Kettering Bug in 1918. With oversight from the Federal Aviation Administration, which will eventually come, UAVs can become workhorses for commercial enterprises ranging from cattle ranching to firefighting. Just imagine a rancher launching a hand-launched UAV to explore his fence line for breaks, or a firefighter using one to keep track of her team. Similarly, the Navy's development of unmanned surface vessels and submarines might become boons to shipping and fishing.

What novice or unskilled hunter might not benefit from a highly precise scope, or better yet, smart ammunition on the opening day of deer season? What about improved equipment, including energy efficient products, for campers? Examples, and potential, abound.

The only thing now standing between this truly modest proposal and making a profit on defense programs is the will of Congress and the president. And, there will be plenty in and out of Congress who will argue that such a proposal would harm the competitive advantage of commercial enterprises in the United States. However, remember: *extremis malis extrema remedia*, what we have come to use as "Desperate times call for desperate measures." We are in those desperate times, and if we don't do something about it, all U.S. businesses will be harmed.

In the next issue of *Defense AT&L*, we fix the Social Security funding shortfall problem. &

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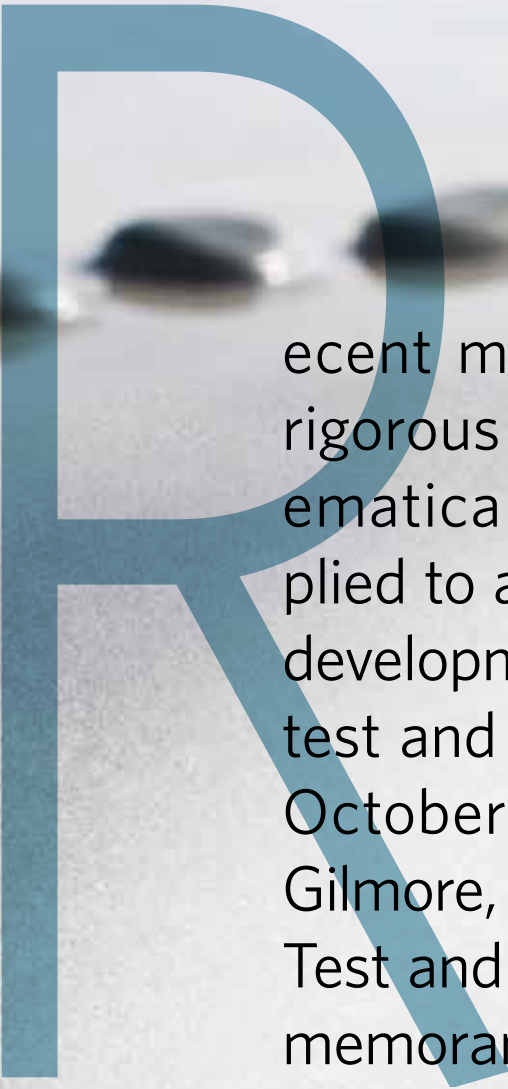
Design of Experiments for Information Technology Systems

What Program Managers Should Know About the Plan and Design Phases

Rachel T. Silvestrini, Ph.D. ∎ Maj. William J. Parker III ∎ Ginger Sammito

ecent mandates require that rigorous statistical and mathematical approaches be applied to all tests that fall under developmental and operational test and evaluation (T&E). On October 19, 2010, J. Michael Gilmore, director of Operational Test and Evaluation, released a memorandum to the T&E community within the DoD that describes an initiative designed to increase the use of scientific

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> **The use of DoE ensures that the experiment is planned in such a way that minimizes the resources spent, while maximizing the information obtained.**

and statistical methods to develop rigorous methods for test and data analysis. Dr. Gilmore's memo specifies the need for using rigorous statistical based testing methods in order to ensure that proper and sufficient data is collected to answer the question of interest. In addition, Edward R. Greer, the director of Developmental Test and Evaluation, has championed the skillsets of design of experiments (DoE), statistics, and test design principles in the rejuvenation and development of the T&E workforce as one of his top initiatives to the practice of T&E.

The framework that encompasses the statistical and mathematical approaches for T&E is called scientific based test design (SBTD). SBTD can be applied to all fields and application areas within the T&E realm. There is no set of T&E experiments in which SBTD does not apply. For example, consider the program manager (PM) who is involved with IT systems and feels that SBTD cannot be applied to his/her respective system because the variable measures of interest in the experiment results in a binary outcome. In other words, did the system work (yes or no)? Although this is a formidable challenge that must be considered prior to running the experiment, it is not a showstopper.

SBTD is a framework that includes statistical based methods for T&E such as DoE and regression analysis. DoE is a formal approach for the development of a set of tests to be carried out in an experiment. An experiment is a large number of individual tests (also called trials or runs) where variables are manipulated and data is collected.

There are abundant sources of literature on DoE that describe the mathematical and statistical based tactics for designing and analyzing the results of an experiment that can meet the needs of any experimental goals. These methods ensure that valid, objective, and scientific conclusions are reached. Additionally, the use of DoE ensures that the experiment is planned in such a way that minimizes the resources spent, while maximizing the information obtained. Figure 1 highlights the four phases of the DoE approach: Plan, Design, Execute, and Analyze.

Unlike the T&E of traditional weapons systems such as aircraft, tanks, artillery, maritime vessels, etc., the PM involved with IT systems testing may expe-
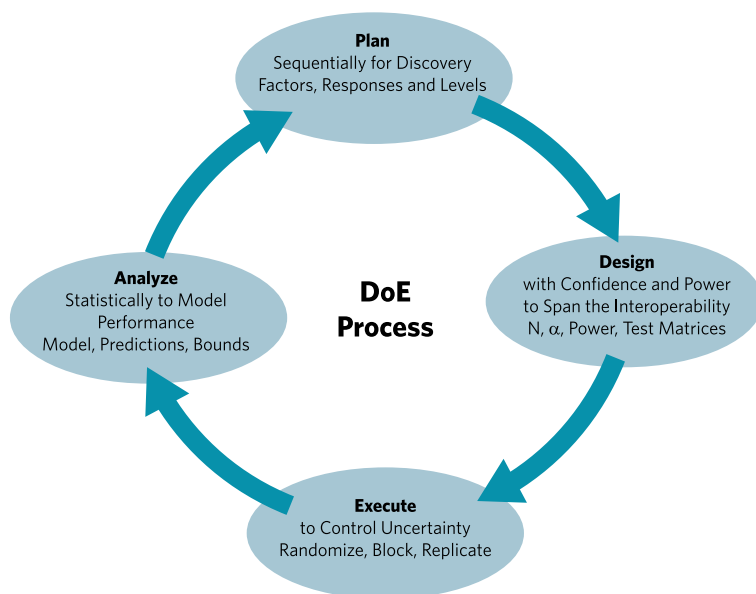
rience slightly different challenges associated with the T&E processes. However, the phases of DoE process do not change for anyone. While this article is primarily aimed at the PM within T&E of IT systems, it is intended to be beneficial reading for any PM involved with T&E in the DoD. The remainder of this article will briefly cover how to apply the first two phases of DoE through an example application to an IT system. When appropriate, specific challenges one might encounter will be highlighted.

Applying Science Based Testing Designs

The DoE approach to the experiments conducted during the T&E process is displayed in Figure 1. The first two phases of this process (Plan and Design) will be discussed through an example application to an IT system.

Suppose that a PM is in charge of oversight for a new software application being developed as a test tool. The experiment used to test the software is called Bravo Test. During Bravo Test different message types for multiple platforms with an Identification Friend or Foe (IFF) system are both transmitted and received. A DoD architecture framework is illustrated in Figure 2. Bravo Test will take place at the systems level (middle view).

Figure 1. Design of Experiments (DoE) Process

Plan
Sequentially for Discovery
Factors, Responses and Levels

Design
with Confidence and Power
to Span the Interoperability
N, α, Power, Test Matrices

DoE Process

Analyze
Statistically to Model
Performance
Model, Predictions, Bounds

Execute
to Control Uncertainty
Randomize, Block, Replicate

Compliments: 46th Test Wing OA

Phase 1: Plan

The first phase in the DoE process is Plan. This phase includes statement of the goal of the experiment as well as the development of a list of variables involved in the experiment. There are three types of variables important to list:

- variables that will be manipulated or controlled during the experiment
- variables that cannot be controlled, but may change during the experiment
- variables used to measure the system (outcomes)

The goal of Bravo Test is to test the accuracy and timeliness of messages transmitted and received. The first objective of Bravo Test is to determine whether or not each of four different platforms transmits or receives messages with accuracy rate above 99 percent. The second objective is to model the expected time to transmit and receive a message as a function of the different platforms, identification systems, and type of message. The PM should be aware that the recognition of the goal and objectives in a test often aid in identifying the variables present in the experiment.

Table 1 illustrates the three different controllable variables that will be manipulated (changed) over the course of Bravo Test. Remember; variables that can be controlled as well as those that cannot be controlled should be identified. For example, during Bravo Test the average system load during the transmission of a message may be measurable, but it may not be a variable that is directly controllable. The PM should be eager to identify all uncontrollable variables possible and additionally keep in mind that it is possible that a few variables may not be known initially, but will emerge later. This should not be a stumbling point, but an opportunity for the PM to refine the test during the next cycle with more information. This involves going back to the planning phase and proceeding from there.

Example Factors to be varied during Bravo Test

| Controllable Variables	Settings During Test
IFF (Identification, Friend, or Foe)	Range 0 - 5
Message types	UTF-8, UTF-16, UTF-32 (UTE = Unicode Transformation Format)
Producing or Consuming Platforms	A, B, C, D

In Bravo Test, there are two outcome variables: (1) accuracy of message and (2) time to transmit/receive message. Accuracy is a binary variable: if the message is 100 percent correct, the data point will be considered 1 (accurate); otherwise 0 (not accurate). In IT systems testing, a binary response is a common metric of interest. Also, many outcome variables may be collected for a single test within the experiment; this is important to note and is used when assessing the quantity of tests required for the experiment.

Without proper care in the Plan phase of the experiment, the direction of the experiment may become unclear. This leads to the collection of erroneous or incomplete information, which will prevent the experimental goals from being met. Often, determining the variables of interest in an experiment can be a difficult task that should be undertaken with caution. Fishbone diagrams as well as other brainstorming techniques often work well during subject matter expert meetings to discuss variable selection.

Figure 2. DoD Architecture Framework with Systems View in Center

The **Operational View** describes and interrelates the operational elements, tasks and activities, and information flows required to accomplish mission operations.
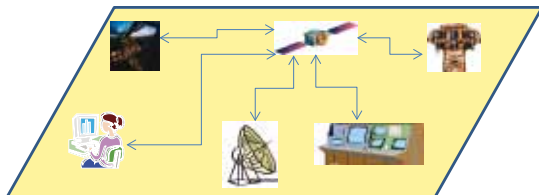
The **Systems View** describes and interrelates the existing or postulated technologies, systems, and other resources intended to support the operational requirements.
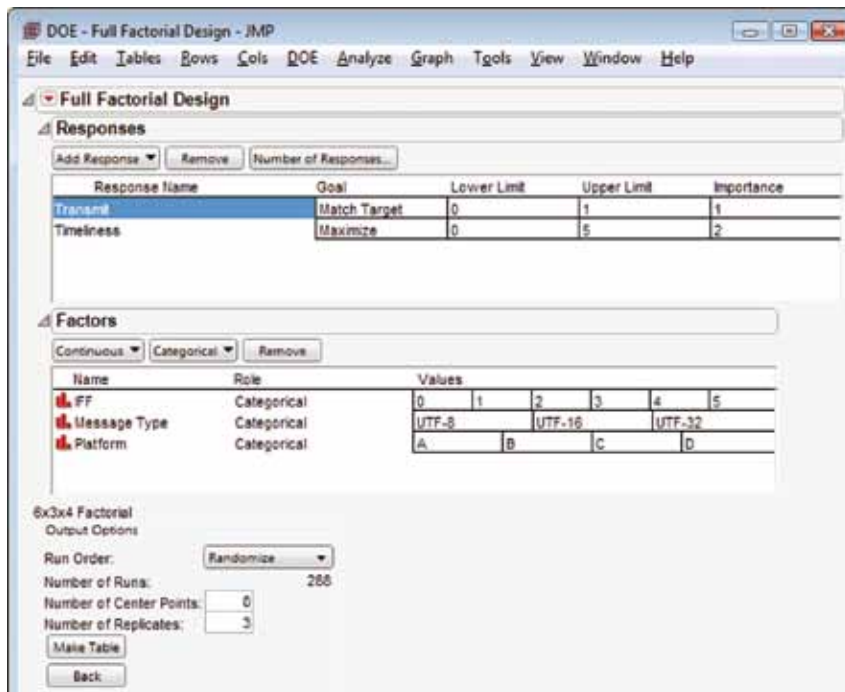
The **Technical View** describes the profile of rules, standards, and conventions governing systems implementation and forecasts their future direction.

DoD Architectural Framework (DoDAF)

Phase 2: Design

The Design Phase involves mapping out the sets of tests that will be conducted during the experiment. Specifically, this phase involves the selection of the design type and the determination of the number of tests to be conducted in the experiment (also known as sample size). Each test involves the control and manipulation of variables identified in the Plan Phase. There are a number of different experimental design techniques found in various textbooks, journal articles, technical reports, and case studies.

Examples of design selections include factorial design, fractional factorial design, central composite design, covering array, and optimal design. While

Figure 3. JMP—User Interface for the Development of Full Factorial Design

Figure 4. JMP—Full Factorial Table Design

a PM does not necessarily need to know each different design, they should recognize that different designs are appropriate for different experimental goals. For example, a fractional factorial design is an appropriate design choice when the experimental goal involves finding the subset of factors that influence the outcome variable of interest. This is a goal typically encountered in the early phase of testing. For situations involving multiple responses with overlapping or conflicting goals, a hybrid design approach, in which different design choices are combined, can be used to satisfy all objectives of the experiment.

In addition to design choice, the number of tests to run (or the sample size) of an experiment must be determined during this phase. Given the opportunity, a PM might prefer to choose an unlimited sample size. However, cost, time, and resource constraints often drive sample size choices.

For Bravo Test, a full factorial design with four replicates is selected to support the goals of testing the accuracy and timeliness of messages transmitted and received. A statistical software package, such as JMP (illustrated), can be used to create the design. Snapshots of the design creation are shown in Figure 3 and Figure 4. Figure 3 illustrates the user interface that guides the inputs to the development of the design. Figure 4 contains the design. The design dictates the running of every experimental test. For example, the first experimental test will be conducted with IFF = 2, Message Type = UTF-16, and Platform = D.

A full factorial design is appropriate for the needs of Bravo Test. In Bravo Test, simple relationships between IFF, Message Type and Platform will be investigated. In other situations, different designs may be more apt. The factorial design dictates a baseline number of runs in the experiment. That number can be altered by repetition of the experiment (as seen in one of the selection tabs in Figure 3). It is important for the PM to realize that within a resource-constrained environment, a single experiment cannot provide unlimited answers. Both design choice and sample size restrictions translate to restrictions on what information can be obtained. Statistical and math-

ematical analysis can greatly help overcome sample size dilemma by focusing on answering the following:

- Given a fixed sample size, what information can be measured and modeled?
- Given measurement or modeling requirements, what sample size is required?

Approach (1) involves identifying risks in the constrained environment and approach (2) involves determining requirements of sample size based on the risks the experimenter is willing to accept. Risks can be discussed in terms of confidence level and/or power of mathematical estimation. These are two terms related to statistical analysis that PMs should be or become familiar with.

During the Design Phase, the PM should encourage documentation of the methodology that includes rationale for selecting a design, sample size, and lessons learned from the process. Clear documentation will help the PM face the challenges of the iterative DoE process and development stages as the software moves towards maturity.

Conclusion

SBTD methods, specifically DoE, can and should be applied to T&E of IT systems. There are many case studies that document the success of the DoE approach for both IT and non-IT systems. This article covered the Plan and Design phases in the DoE approach. It is believed that the Plan and Design

phases are of utmost importance because an inadequately designed experiment will result in poor results and possibly incorrect conclusions, thus making the Execute and Analyze phases meaningless.

The Execute Phase refers to the running of each test in the experiment. For Bravo Test, the experiment to be run is illustrated in Figure 4. During this phase, it is imperative that each test is run to specification. This involves ensuring that proper blocking, randomization, and replication are carried out as specified by the design. The Analyze Phase encompasses a mathematical study of the resulting data to obtain valid and objective conclusions.

Sometimes the challenges and decisions in the creation of an experimental design approach appear endless for the PM, especially as requirements shift from traditional testing to rigorous SBTD for IT systems. The PM must ensure compliance with applicable policies. The PM is also responsible for the quality and consistency to those standards while developing test reports based on a sound, scientific rigor that have not formally been a part of any IT system/program. The PM needs to look beyond the present in facing these SBTD challenges in IT systems and focus on the valid, objective, and measureable approach that ultimately saves time and money over the development cycle of the IT system. 🏵

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COST WARRIOR MONEYBALL

Denise A. Little

> **We've outlined my program's command [cost] requirements consistently and in detail over the past 3 years. I don't want to waste time on a semantics debate over what I call my requirements.**
>
> —Program manager during a weapon system review

We could all learn a thing or two from the Oakland A's general manager, Billy Beane, who took his team with a shoestring budget to the play-offs in 2002. The A's spent $41 million on player salaries, compared with the New York Yankees, who spent more than $125 million. According to Michael Lewis' *Moneyball: The Art of Winning an Unfair Game,* Billy's plan used performance metrics to select players, recruit an entire team, and compete against teams like the Yankees, who can afford practically any player they want.

Little is the operations officer for the Marine Corps Logistics Vision & Strategy Branch at Headquarters Marine Corps. She is a retired Army Aviation Logistician and Maintenance Officer, an acquisition logistician, and a sustainment cost analyst. She was a member of the Army G-4's Army Campaign Plan 2012 writing team.

Billy successfully played hardball when it came to recruiting and trading yet took care of the players, the organization, and the fans with a poetic integrity. He committed to his strategic vision and tactical plan. He performed analysis, coached financial stakeholders and peers alike, and he even taught those who doubted the process. He went the distance—and years—to convince them of the hard right over the easy wrong. He realized that deliberate planning and analytics take time and patience. He is a change agent in Major League Baseball's own brand of cost culture. So how do Cost Warriors apply Billy's winning approach to strategic communications?

Overwhelming Underdogs

Take a look at the role that the Army G-4 plays in cost management, and compare it to Billy's strategic plan. The Army G-4 logistician analyzes sustainment costs to provide decision support for the secretary of the Army and the assistant secretary of the Army for acquisition, logistics and technology (ASA[ALT]) concerning system life cycle cost or total ownership cost. (The ASA[ALT] is also the army acquisition executive.) Acquisition executives must consider both cost and affordability when approving milestone decisions. Sustainment costs include depot-level maintenance, software maintenance, logistics assistance representatives, and more.

To give you perspective on the size of the budget that the Army G-4 manages, it averages 4 percent of Army resources. Out of six Army Program Evaluation Groups (PEGs), Army G-4's Sustaining PEG comes in next to last place, just ahead of the Organizing PEG. According to recent G-8 Program Analysis & Evaluation (PAE) office's figures, manpower annually leads the pennant race with a whopping 40–45 percent of the budget. Consider that procurement comes in a distant second between 14 percent and 18 percent. However, the manpower portion of the budget doesn't include personnel labor for those who perform depot and other sustainment. They include Field Software Engineers who perform software support, logistics assistance representatives who provide technical guidance, and engineers who provide modification work order support.

I was reminded by Cecile Batchelor, the Army cost culture initiative program manager and special assistant to the deputy assistant secretary of the Army for cost and economics, that we should compare historical data to our long-term budget expectations. "We should ask ourselves how our original expectations compare to our current budget requests, and ask what we are doing to improve." Marc Gutleber, of the U.S. Army Communications-Electronics Command (CECOM), led Army G-4 cost analysts with building the software maintenance/sustainment cost element structure and each element's definitions. He added to Batchelor's questions on budget expectations. "We should also ask what changed since the original expectation. Did the projected 'cost savings' ever materialize? Did the sustainment costs dramatically increase, and why?" He noted that the Army had planned to field a system at division headquarters level, then changed the plan to field it down to the brigade level; this increased the necessary number of

systems by the hundreds. The result was an apples-to-oranges comparison of the original estimate produced at milestone A to the estimate produced years later for the full rate production milestone review.

So why go to all this trouble to apply cost management to the sustainment programming and budget process? There's a DoD-wide problem of low-balling sustainment costs, and in our constrained budget environment we need to have realistic estimates to understand what we're committing ourselves to over the 20- to 30-year system life. Here's a notional example of software maintenance. At milestone A, a program manager estimates software maintenance at $1 billion per year in the original life cycle cost. Then by milestone C, the estimate ballooned to $6 billion. Less than a year later during the next program objective memorandum (POM) build, it increased again to $7 billion. How did this happen? To make a long story short: each agency and each forum had a different way of defining software maintenance. Each had its own set of cost elements with different definitions for each cost element.

The low sustainment estimates are further complicated by the annual competition for a piece of the operations and maintenance (O&M) appropriations budget pie. The life cycle management commands (LCMC) that fall under the Army Materiel Command (AMC) present sustainment command requirements that are consolidated into functions that support multiple systems. Sustainment command requirements are funded through functional channels, such as sustainment systems technical support (SSTS) programming that includes logistics assistance representatives, second destination transportation, and post production software support (PPSS). They are not always specific to the individual program. The program manager as the total life cycle manager partners with his/her LCMC(s), the Army G-4, G-3, and G-1, in the projection, management and synchronization of the O&M appropriations.

Say it ain't so, Joe!

The Army G-4 came up with its strategic game plan for cost management implementation in Fiscal Year (FY) 2010. Chaired by Joint Staff's director of logistics (J-4) and facilitated by the deputy assistant secretary of Defense for program support, the Defense Materiel Readiness Board (DMRB) tasked each Service's Deputy Chief/Commandant for Logistics to outline an approach to total ownership cost optimization.

It was Oakland's (Army G-4's) turn on the pitching mound to brief the DMRB. Their integrity was on the line. Did the coach send its Cy Young contender to the mound with instructions to intentionally walk the batter? Gloss over existing Army regulations and say that the World Series POM FY 2013–2017 championship was all cinched up?

No, the team managers took the hard right. The pitcher aimed for the board's strike zone to deliver a meaningful discussion on their current status, even though it meant extra innings and an extended season.

It ain't over till it's over.

What was the Army's status? There are regulations and directives—lots of 'em! But how well were they implemented? How clearly do we understand them? Some were ambiguous or at times in conflict with others. And saying so would mean sending some starting pitchers to the dugout during the fourth inning. But despite challenges, they had a plan and were already making steady progress.

They reviewed existing standards and identified a few that were unrealistic. They socialized the plan to gain momentum using existing forums, such as the Cost Review Board working group and the Weapon System Reviews. They weren't reinventing the wheel, just making it better. They set out to make sustainment cost estimates reliable, repeatable, and accurate.

ing, fielding, and equipping actions) pays for post deployment software support (PDSS), through the Equiping PEG.

PDSS is like hundreds of pop-up balls flying into the bleachers during batting practice. In other words, they are a multitude of software issues that require patches and troubleshooting, in addition to the operational maintenance costs such as paying for licenses, implementing information assurance vulnerability assessments, certification, providing field level software maintenance, etc. If software maintenance occurs *during or after* the first full year after the hardware production line ends, software maintenance typically is in its steady state. This is post *production* software support (PPSS). If it's PPSS and organically supported, then the Army G-4 pays for it.

To give you perspective on the size of the budget that the Army G-4 manages, it averages 4 percent of Army resources.

You can observe a lot by watching.

The Army G-4 talked with product support, business and cost managers, and explained to them that the Army was in new territory. The three managers make up the vital team who would translate their logistics/sustainment support jargon into the appropriate sustainment cost elements.

Then we throw into the semantics batting cage the various ways to use the word "sustainment." When we hear the word sustainment and find out that there's a Sustaining PEG, we might assume that all sustainment-related costs are paid by the Army G-4 Logistician. But the Army G-3 Operations and Training team pays for spare and repair part replenishment, for field-level maintenance and other expenses, through the Training PEG.

Programming for software maintenance can also be confusing. It contains the word "maintenance," so naturally the Army G-4 pays for maintenance, right? It depends on when the maintenance occurs. The transition occurs during the first full year after the hardware production line ends. If the software maintenance occurs *before* the first full year after hardware production line ends, then the Army G–8 (responsible for fund-

There's one more software maintenance twist! Does the software maintenance support a business or software-intensive system that's not tied to a weapon system or its hardware? If so, the primary stakeholder is the post production software maintenance bill payer. The Integrated Personnel and Pay System—Army (IPPS–A) business system illustrates this point. It's a *personnel* business system, so the Army G-1 is the primary stakeholder and is responsible for programming and managing those post production software maintenance funds. The same is true of the Army G-4 who pays for the Logistics Management Program business system's post production software maintenance.

Sweet Caroline, good times never seemed so good.

While we need to know how much the program costs, whose office decides if it's affordable? Who decides who will program the money? That's Army staff business in the franchise head shed, right? The truth is that we need to know its cost, affordability, and stakeholders to ensure that we programmed and budgeted for it properly. So let's go to the Cost Warrior basics for the plan.

First, if we know how much it costs, then we can figure out if we can afford it. We must initially determine the true cost by defining each cost category, that is, the cost element structure. The program office estimate (POE) cost categories and their definitions must match those used by the budget, cost, and logistics managers throughout the Army.

Second, is it affordable? Do we have enough money budgeted over the next five years to cover our costs? More importantly do we have enough to cover costs over the system's entire life (total ownership cost or life cycle cost)? Did we consider just the one system? Or did we consider all the systems that make up one portfolio consisting of similar systems that have a related or parallel mission? In an address to an Armor Warfighting Conference, Gen. Peter Chiarelli said, "If you look at any one of these systems as an individual system, you can sell just about anything. But, when you look at the entire

(O&M) appropriation's [Sustaining PEG] Total Obligation Authority (TOA) decreased in FY12, and will continue to decrease over the next five years as the Army implements the SECDEF's [Secretary of Defense] efficiencies initiatives."
—Army Campaign Plan 2012

Let's root, root, root for the home team.

The Army Materiel Enterprise team will have confidence in their estimates, because everyone will be using the same cost category definitions. The O&M sustainment estimate becomes reliable, repeatable, and accurate. Let's use analytical gauges of cost estimates to enable ourselves to compete successfully during the POM validation process.

Applying cost analysis to a program develops your cost-management and cost-analysis skills and makes you competent in this emerging skill set. You can use cost analysis to determine

> **There's a DoD-wide problem of low-balling sustainment costs, and in our constrained budget environment we need to have realistic estimates to understand what we're committing ourselves to over the 20- to 30-year system life.**

portfolio you can start to see where we have duplication in different systems or maybe we're overinvesting in one and underinvesting in another." Perhaps we could incorporate a 20–30 year strategic planning budget that includes all sustainment costs.

The future ain't what it used to be.

Third, change takes time and patience. Over the past 10 years, big money has been flowing. It was as if the San Francisco Giants starting pitcher, Tim Lincecum, brought on the heat with incessant fast balls and change-ups in the form of never-ending deployments and high operational tempo. If we needed more than the anticipated base dollars, we would go to his all-star teammate and closing pitcher, Brian Wilson—also known as Overseas Contingency Operations (OCO) budget requests. But the future is now, and we find ourselves with more fiscal constraints than ever. Something has to give as base dollars decrease and continual OCO dollars become a distant memory.

"The Army's ability to balance its fiscal, materiel, and personnel requirements is critical since the Operations & Maintenance

player performance and come up with a winning strategy for the entire portfolio. How are we doing compared to the original expectation (our estimate)? If not great, what are we doing to improve? Managing sustainment life cycle costs means answering those questions to snag a spot on the Cost Warrior team.

Each agency could set a goal to win the cost management Triple Crown. What if you prepared action officers to become your agency's Los Angeles Dodger Clayton Kershaw, who won the Triple Crown in 2011? First, encourage them to sharpen cost management and analysis skills by taking Defense Acquisition University online and resident courses. Second, ask them to attend the four-hour cost-benefit analysis course. Third, set their sights on the four-week resident cost-management certificate course at the Naval Postgraduate School in Monterey, Calif. The Triple Crown? Hey, it could happen!

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Defense AT&L

Writers' Guidelines in Brief

Purpose

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

Submission Procedures

Submit articles by e-mail to datl(at)dau.mil. Submissions must include each author's name, mailing address, office phone number, e-mail address, and brief biographical statement. Each must also be accompanied by a copyright release.

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

Deadlines

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

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

Audience

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

Style

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

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

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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.**

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