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Defense Acquisition Research Journal

A Publication of the Defense Acquisition University

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Proposed Leadership Structure for Joint Acquisition Programs

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Department of Defense (DoD) acquisition programs are becoming more joint, and joint acquisition programs are critical to mission success. In the current DoD acquisition and requirements structure, joint programs are usually assigned to one of the Component Acquisition Executives (CAEs). This causes or exacerbates some of the shortfalls of the existing joint acquisition process. This article investigates the benefits and difficulties of one specific organizational change: creating a Joint Acquisition Executive (JAE), managing joint programs only and reporting to the Under Secretary of Defense for Acquisition, Technology and Logistics, as a peer to current CAEs.

Experience Catalysts: How They Fill the Acquisition Experience Gap for the DoD

p. **53** *Col Robert L. Tremaine, USAF (Ret.)*

In any business, trade, or profession, experience matters. Not surprisingly, the public tends to look at experience as a necessity when personal safety is paramount. Professions like the medical, transportation, and construction industries all rely heavily on experience. They take considerable time to qualify their respective corps through various experience incubators like internships, fellowships, apprentices, etc.—all on the job. They learn by "doing." Without "doing," these personnel may face challenges later they cannot easily overcome when "know-how" matters the most. The defense acquisition profession is no different. Experience has always been a vital constituent component. This article addresses the experience catalysts that matter most to the Defense Acquisition Workforce.

U.S. Space Acquisition: Challenges in the Final Frontier

p. 75 *Barry "Jay" Borst, Shahram Sarkani, and Thomas Mazzuchi*

Space contributes to the security and economic stability of the United States. However, numerous studies, articles, and surveys state export control is hurting the space industrial base. The nation's ability to acquire space systems, according to many published sources, is diminishing and may impact its leadership in the field of space. Many claim excessive export controls as one of the primary causes and often cite statistics, data, and information contained within a 2007 Air Force Research Laboratory (AFRL) survey to validate their claim. While the AFRL survey certainly provides insight and should not be entirely discounted, the application of System Dynamics Modeling suggests the survey's findings on export control are outdated.

The More Things Change, Acquisition Reform Remains the Same

p. 99 *Col Peter K. Eide, USAF, and COL Charles D. Allen, USA (Ret.)*

For over 60 years, the Department of Defense has attempted to fix its weapon systems procurement without success. While notable exceptions emerged during the Global War on Terrorism (i.e., rapid development/fielding of Mine Resistant Ambush Protected vehicles and Improvised Explosive Device defeat systems), "Acquisition Reform" efforts have not consistently yielded a process/system that delivers products faster, better, or cheaper. In 2009, President Obama took the initiative to give reforms another try. Through an analysis that applies John P. Kotter's model of organizational change and Edgar H. Schein's approach to organizational culture and leadership, the conclusion suggests that current initiatives will not be successful. Behavioral change is needed to embed transformation. Acquisition reforms can be coerced, but will not endure as true transformation unless cultural change occurs.

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The Defense Acquisition Research Journal (ARJ) is a scholarly peer-reviewed journal published by the Defense Acquisition University (DAU). All submissions receive a blind review to ensure impartial evaluation.

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From The Executive Editor

This issue marks the first anniversary of the newly titled *Defense Acquisition Research Journal*. As I explained in these pages a year ago, this journal support's DAU's role in providing "thought leadership that helps improve acquisition outcomes".

As part of the continuing development of that thought leadership process, DAU, in consultation with the DoD, academia, and industry, is generating a list of topics that can guide potential researchers as to the questions that are of particular concern to the broad defense acquisition community. We have stood up a new body, the Research Advisory Board (whose members appear on this journal's masthead), which will help vet and prioritize these topics. These topics appear in the DAU Research website http://www.dau.mil/research/Pages/researchareas.aspx, and future issues of the *Defense ARJ* will include highlights of these research areas.

The articles in this issue reflect the theme "Shifting Paradigms," for they all tackle subjects that mark the movement away from "traditional" defense acquisition and into uncharted territory. Rene Rendon and his co-authors compare the acquisition of services across the DoD, a very timely subject given that the DoD now acquires more services (maintenance, information) than traditional "goods" (planes and tanks). Howard Harris and Mark Lewis examine leadership in joint acquisition programs, which are replacing single-Component acquisition programs in many areas.

Robert Tremaine examines the move away from "years in a seat" measures of career skills, toward the use of specific experiences that can act as catalysts for on-the-job learning. Jay Borst and his co-authors employ new analytical methods to overturn the idea that export controls are hampering U.S. industries in the international satellite market. Peter Eide and Charles Allen revisit 60 years of defense acquisition reform and propose a re-think of the focus of such efforts. Finally, Sydney Coelho reviews *Wired for War* by P. W. Singer, whose examination of the rise of robotics surely marks the most far-reaching paradigm shift of 21st century defense acquisition.

Dr. Larrie D. Ferreiro
Executive Editor
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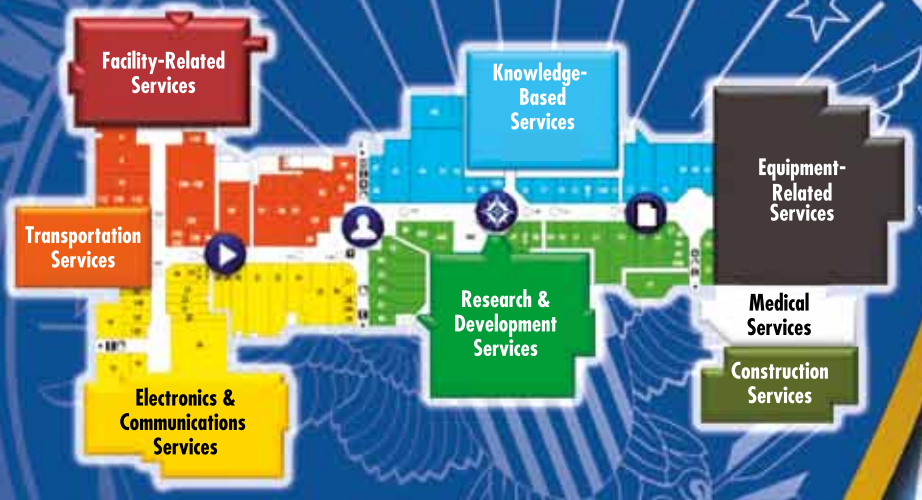
Understanding the Nuts and Bolts of Acquiring Services



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Services Acquisition in the DoD:

A Comparison of Management Practices in the Army, Navy, and Air Force

Rene G. Rendon, Uday M. Apte, and Aruna Apte

This article presents the results of empirical studies of current practices in services acquisition in the Army, Navy, and Air Force. The authors studied the management practices in areas such as contract characteristics, acquisition management methods, use of the project management approach, acquisition leadership, and ownership of requirements. They also studied areas such as the ability of personnel responsible for acquisition, adequacy of acquisition billets and their fill rates, and training provided to services acquisition personnel. The data confirmed that the Navy uses a regional contracting approach, while the Army and the Air Force use an installation-level approach. These differences have important implications for other acquisition management practices, such as the use of project management and contractor surveillance.

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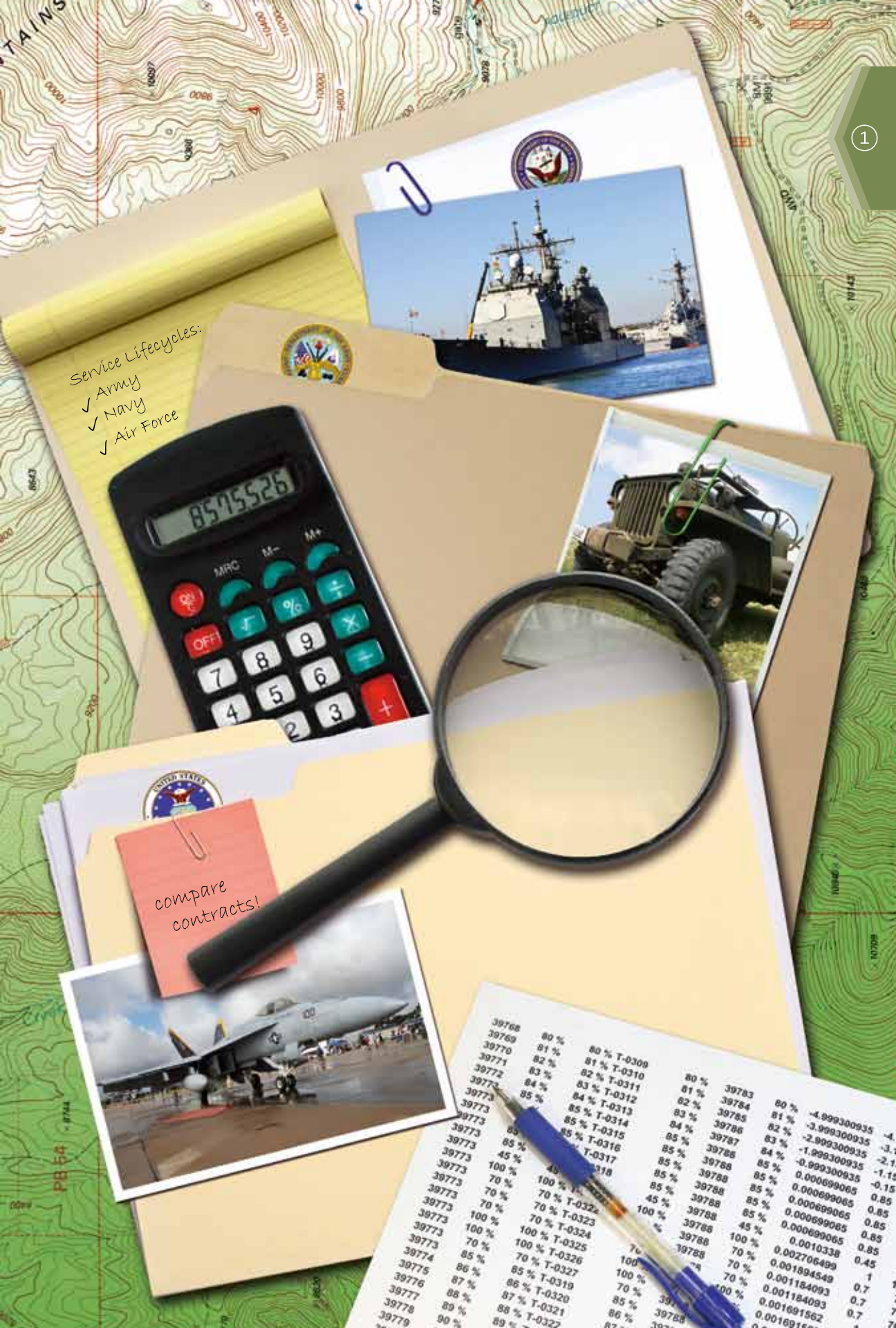
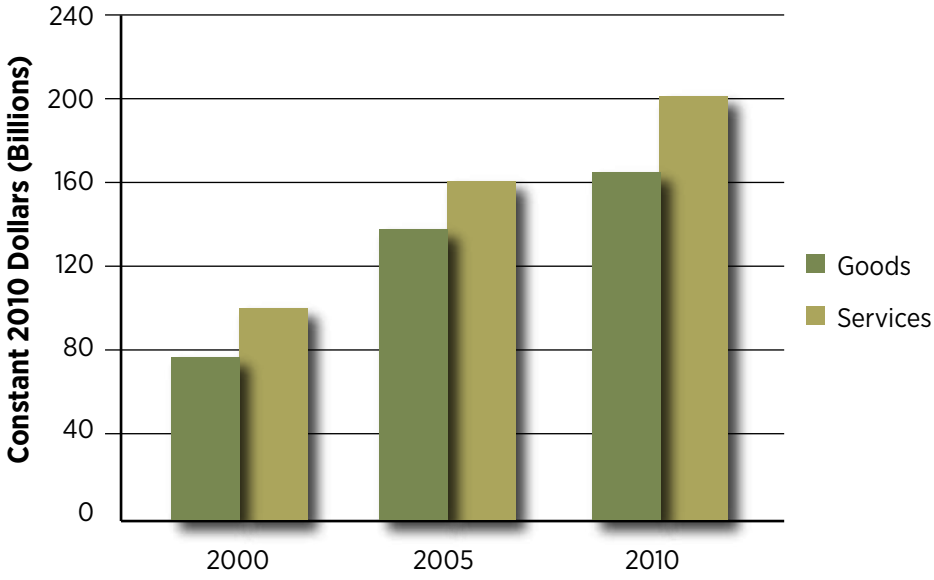

Service Lifecycles:
✓ Army
✓ Navy
✓ Air Force
compare contracts!

The service sector represents the largest and fastest growing segment of the economies of the United States and other developed countries. In the United States, services accounted for well over 85 percent of employment in the year 2007 (Apte, Nath, & Karmarkar, 2011). This growth of services in the overall economy has been mirrored by the growth of services acquisition in private-sector companies (Smeltzer & Ogden, 2002) and in the government. For example, as seen in Figure 1, the procurement of services in the DoD has continued to increase in scope and dollars in the past decade. Even considering the high value of weapon systems and military equipment purchased in recent years, the DoD has spent more on services than on supplies, equipment, and systems together (Camm, Blickstein, & Venzor, 2004). Specifically, the DoD obligations on contracts have more than doubled between fiscal years 2001 and 2008—to over $387 billion, with over $200 billion spent just for services (Government Accountability Office [GAO], 2009a).

FIGURE 1. DoD'S CONTRACTS FOR GOODS AND SERVICES (2000–2009)



Note. Adapted from "Defense Contract Trends: U.S. Department of Defense Contract Spending and Supporting Industrial Base," by J. R. Ellman, D. Liverood, D. Morrow, and G. Sanders, 2011. Center for Strategic & International Studies.

As the DoD's services procurement continues to increase in scope and dollars, the DoD must give greater attention to the management of services contracts. However, the increase in services contracting has coincided with a reduction in the Defense Acquisition Workforce. The Defense Acquisition Workforce fell from approximately 500,000 personnel in 1990, to approximately 200,000 personnel in 2006—a decrease of approximately 65 percent. For the U.S. Army, from 1995 to 2006 acquisition dollars increased by 382 percent, acquisition actions increased by 359 percent, yet the acquisition workforce decreased by 53 percent (Gansler, 2011, p. 237).

This mismatch between the increasing workload and the decreasing size of the workforce, and the unique nature and complexities associated with services acquisition, has possibly created an environment wherein following the best practices has not always been feasible. Between 2001 and 2009, the GAO issued 16 reports related to trends, challenges, and deficiencies in contracting for services. In addition, between 2002 and 2008 the DoD Inspector General (DoD IG) issued 142 reports on deficiencies noted in the DoD acquisition and contract administration process. A summary discussion of these deficiencies is provided in the Appendix.

The characteristics of service production differ from manufacturing production in several ways. The key differentiating characteristics of services discussed in textbooks (Fitzsimmons & Fitzsimmons, 2006; Metters, King-Metters, & Pullman, 2003) include the intangibility of service output, co-production, simultaneity of production and consumption, the inability to store services, and the complexity in the definition and measurement of services. The differences in the production of services as opposed to that of manufactured products give rise to an important question: Is the acquisition of services essentially the same as acquisition of products? If differences exist, then what are they, and what do they imply for the contracting of services? Given the growth in size and scope of services acquisition in today's economy, these questions are undoubtedly important.

This article analyzes and compares primary data collected by researchers from completed surveys involving the Departments of the Army, Navy, and Air Force; and draws conclusions on how services acquisition is managed within and across the departments. The analysis

of survey results will focus on the following areas: contract characteristics, acquisition management methods, project-team approach, services acquisition leadership, and other management issues.

The article is organized into four sections. In the next section, we describe the empirical studies we conducted, including the survey research methodology we used in the study. We provide the results of the survey data analysis and some salient observations in the third section. The findings and conclusions of the study and our recommendations for improving services acquisition and for future research are presented in the fourth section.

Research Methodology and the Empirical Studies

The methodology used in this research consisted of a survey instrument specifically developed to address the research objectives and questions mentioned in the Introduction section. This was a Web-based survey instrument developed using the SurveyMonkey™ software. The developed survey instrument (provided in Compton & Meinshausen, 2007) was first piloted for its validity and was fine-tuned prior to its use in this research.

The Web-based survey was conducted in all three military departments. The following discussion summarizes these survey-based empirical studies.

Army

The standardized survey was deployed to 81 contracting offices. The survey was distributed across 8 major contracting centers throughout the Army, including 40 Army installations. We received a total of 61 responses to the survey, with a survey response rate of 75 percent.

Navy

Since the Navy mostly follows a regional approach in its acquisition of goods and services, we deployed the survey to 6 Navy regional contracting centers and received inputs from all 6 regions, covering 66 Navy installations. In addition, we requested and received responses from Naval Supply and Naval Medical Logistics Command. Thus, our response rate for the Navy survey was 100 percent.

Air Force

The survey instrument was deployed to 50 Air Force Contracting Squadrons, representing 6 Air Force major commands. There were 34 responses from the survey, resulting in a 68 percent response rate. These responses represented all 6 Air Force major commands.

The survey began with questions that focused on specific demographic data, followed by specific questions related to the approach, method, and procedures used in the acquisition of services for specific categories of services. The categories of services targeted in this research were (a) professional, administrative, and management support; (b) maintenance and repair of equipment; (c) data processing and telecommunications; (d) utilities and housekeeping; and (e) transportation and travel. These categories were selected because collectively they represent a significant percentage of spending for all the services, and are commonly acquired in the Army, Navy, and Air Force.

The survey instrument included core questions related to the methods and procedures used in the acquisition of services for the service categories mentioned in the preceding paragraph. These core questions focused on the following areas:

Contract Characteristics

The purpose of this category of questions was to gain insight into the dominant procurement methods and contract types used in the acquisition of services. The contract characteristics examined in this section were degree of competition (competitively bid or sole source), contract type (fixed price or cost type), and type of contract incentive (incentive fee, award fee, or award term).

Acquisition Management Methods

The purpose of this broad category of questions was to understand the management methods and approaches used in the acquisition of individual services at each phase of the contract management process. For each of the contract management phases, the survey questioned whether the phase was conducted at a regional, installation, or some other organizational level. This core question category also focused on whether a project-team approach was typically used in the acquisition of the respective service category. The questions explored the position of

the services acquisition project team leader, such as a program/project manager or contracting officer. The questions also explored information on the owner of the requirement for the service being acquired.

Other Program Management Issues

This last category of core questions focused on the use of a life-cycle approach, the length of assignments for services acquisition management personnel, the use of market research techniques, the level of staffing in services acquisition management, and the level of training of services acquisition management personnel. These questions offered respondents a Likert-type scale to measure the level of agreement or disagreement among the respondents' statements.

Analysis and Comparison of Survey Data

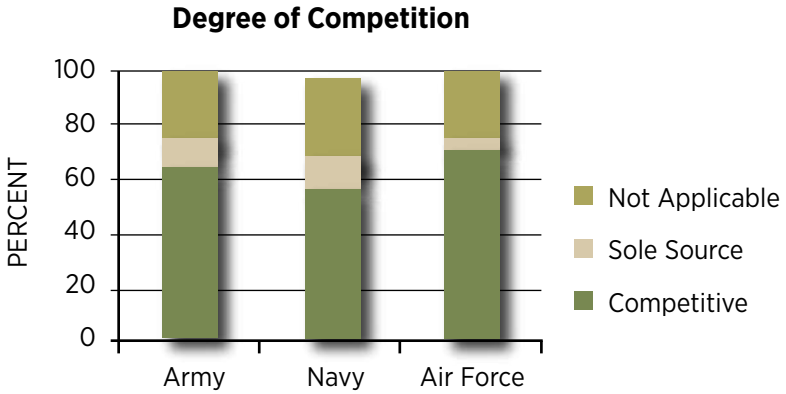
In this section, we present the results of our analysis of survey data (Appendix) concerning the acquisition management practices in the Army, Navy, and Air Force, arranged into the data categories described in the Research Methodology and the Empirical Studies section.

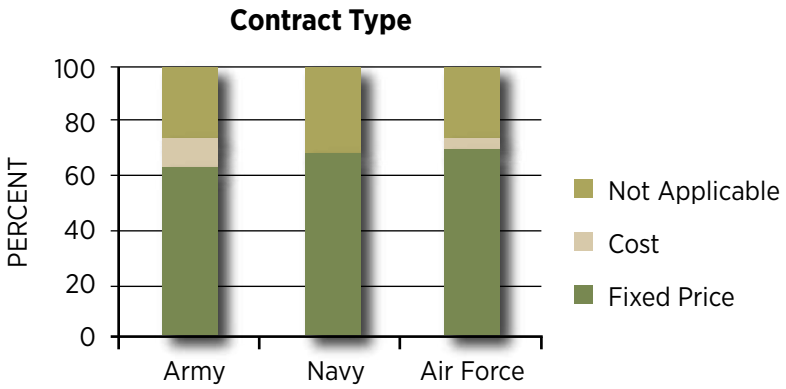
Contract Characteristics

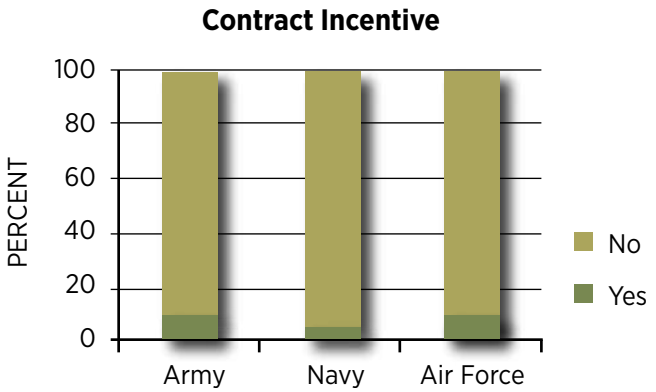
We discuss three aspects of contract characteristics: degree of competition, type of contract, and contract incentives. It should be noted that the Navy and the Air Force surveys were conducted in 2008, while the Army survey was conducted in 2009. Consequently, the Army survey results contain data for 2008, while the data streams for the Navy and the Air Force surveys end in 2007. We used the contract characteristic data for 2007 and computed averages across services and acquisition phases to obtain measures of contract characteristics. The comparison of contract characteristics for the Army, Navy, and Air Force is depicted in Figure 2.

Degree of competition. Providing for full and open competition is a public policy and statutory requirement in government contracting. Unless the government can justify an exception to the competition requirements, the procurement must provide for full and open competition in the solicitation and award of the contract. In addition to supporting accountability and transparency in government contracts,

FIGURE 2. CONTRACT CHARACTERISTICS







competitive procurements also result in competitively priced proposals that increase the government's ability to negotiate a fair and reasonable contract price.

As we note at the top of Figure 2, the predominant procurement approach used in the services we studied was full and open competition. Since these services—administrative, maintenance, data processing, utilities/housekeeping, and transportation services—are traditional and commercial in nature, a valid assumption is that the competitive marketplace should be capable of proposing and competing for these contracts. However, we also note that a small but notable portion of contracts for Navy and Army were sole sourced. We do not have detailed data on these sole-sourced contracts, but perhaps the services acquired were context-specific and unique in nature.

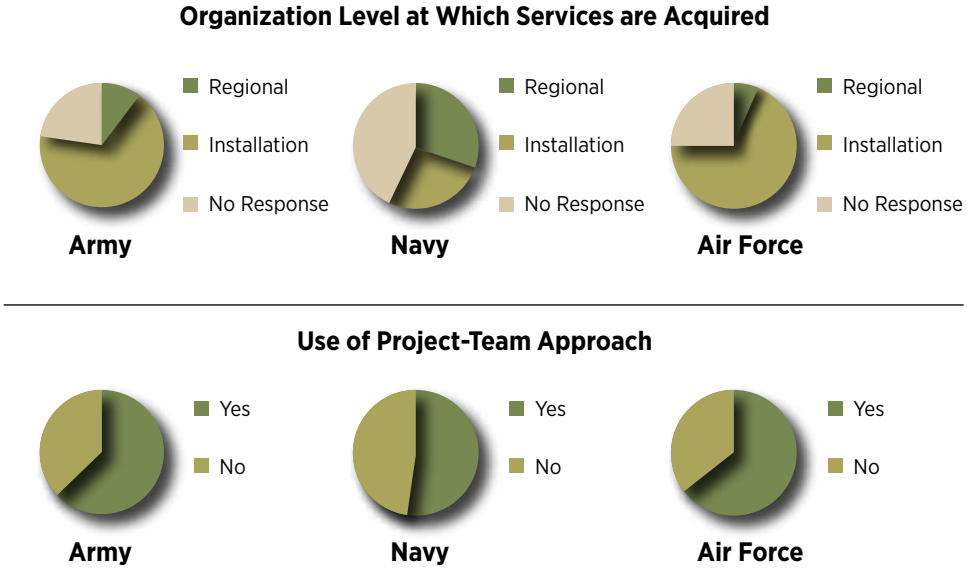
Contract type. The Federal Acquisition Regulation categorizes the major contract types as fixed-price and cost reimbursement. Fixed-price contracts are appropriate for well-defined requirements in situations with a low performance risk. On the other hand, under cost-reimbursement contracts, which are appropriate for developmental requirements, the performance risk is high. Given the commercial and low-risk nature of the services being studied, firm-fixed price contracts would be the appropriate contractual instrument for these service projects. We note in the center of Figure 2 that, as expected, a significant majority of the contracts were fixed price.

Contract incentive. In some situations, the government may want to subjectively incentivize the contractor to meet higher levels of performance and go beyond the basic requirements of the contract. In these situations, award-fee or award-term contract incentives may be used. Since commercial services are usually well understood and the output or outcome can be reasonably well defined, less contract incentives may be needed. This observation is reflected at the bottom of Figure 2.

Acquisition Management Methods

In this section, we provide a comparison of Army, Navy, and Air Force practices in two areas: the organization level at which services are acquired and the use of a project-team approach. The comparison is shown in Figure 3.

FIGURE 3. ACQUISITION MANAGEMENT METHODS



Organizational level at which services are acquired. The military departments procure services and manage services acquisition at the installation level or regional level. The proximity of locations where the acquisition contracts are managed and where the services are actually performed may have an impact on the effectiveness of the project management, as well as the success of the services projects. Services performed at one location, with the contract and overall project managed at a distant location, may result in less-than-adequate management and control of the project as well as less-than-proper surveillance of the service contractor. Insufficient control of the project and less-than-adequate surveillance of the service contractor increase the risk to the DoD of not receiving the full value of its service procurement dollars.

However, in general, it is not possible to say if acquiring services using one specific approach—regional-level or installation-level—is necessarily better than the other approach. The regional approach (centralized procurement) can give rise to economies of scale, uniformity of procedures, and the possibility of consistently using best acquisition practices. On the other hand, installation-level acquisition (decentralized procurement) allows for easier implementation of project management and program

management approaches, including accurate requirements definition and proper contractor surveillance. Under either approach, however, a key to success is adopting suitable management practices.

We note in the top row of Figure 3 that services acquisition in the Navy takes place predominantly at the regional level, whereas services acquisition in the Army and the Air Force occurs predominantly at the installation level. As we discuss later in this section and the next, this difference in approaches has a significant influence on effectiveness of various management practices such as the use of the project-team approach and the position of the person who provides the contractor surveillance.

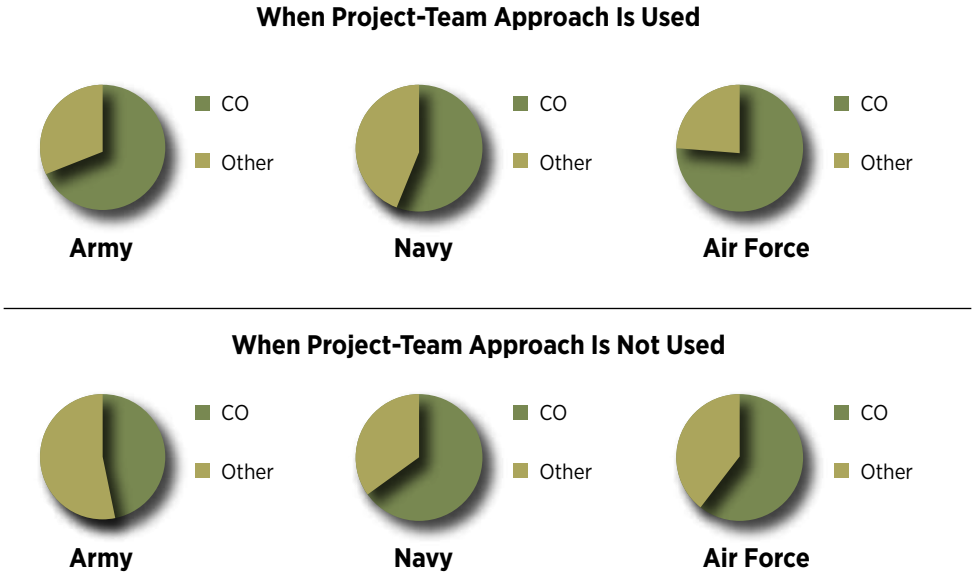
Project-team approach. Services acquisition, such as information technology services or aircraft maintenance services, is typically technically complex and requires support from various functional areas such as engineering, procurement, finance, and logistics. Best practices in project and contract management reflect the use of project teams—specifically cross-functional teams—in the management of services projects. The use of project teams facilitates the proper integration and control of the various functional disciplines involved in the project effort. Insufficient control and functional integration of project activities increase the risk of not achieving the project's cost, schedule, and performance objectives.

We note in the bottom row of Figure 3 that the Army and Air Force use the project-team approach more frequently than the Navy, which uses it slightly more than 50 percent of the time. A plausible explanation is that, in general, when services are acquired at the installation level, the physical proximity of personnel can make it easier to establish and use project teams in managing the acquisition. Thus, the use of the regional approach by the Navy means that it has less opportunity to use project teams. Perhaps a virtual-team approach may need to be adopted by the Navy.

Acquisition leadership. In addition to the use of project teams, another best practice is formally designating a trained project manager with the authority to lead the project effort. The project manager is typically a coordinator and integrator of the various functional disciplines involved in the project and has overall responsibility for the project's success. The project manager is focused on the overall objectives

of the project, and on integrating and balancing the interests of the various functional disciplines (engineering, procurement, finance, and logistics) involved in the services project. Figure 4 provides answers to the question: Who leads the services acquisition project—a contracting officer (CO) or quality assurance evaluator (QAE)/contracting officer representative (COR)? The top row of Figure 4 shows that when a project team is used, the CO predominantly leads the services acquisition project in the Army and Air Force and leads it only slightly more than half of the time in the Navy. The bottom row of Figure 4 also shows that when a project team is not used, the CO predominantly leads the services acquisition project in the Air Force and Navy and leads it only slightly less than half of the time in the Army.

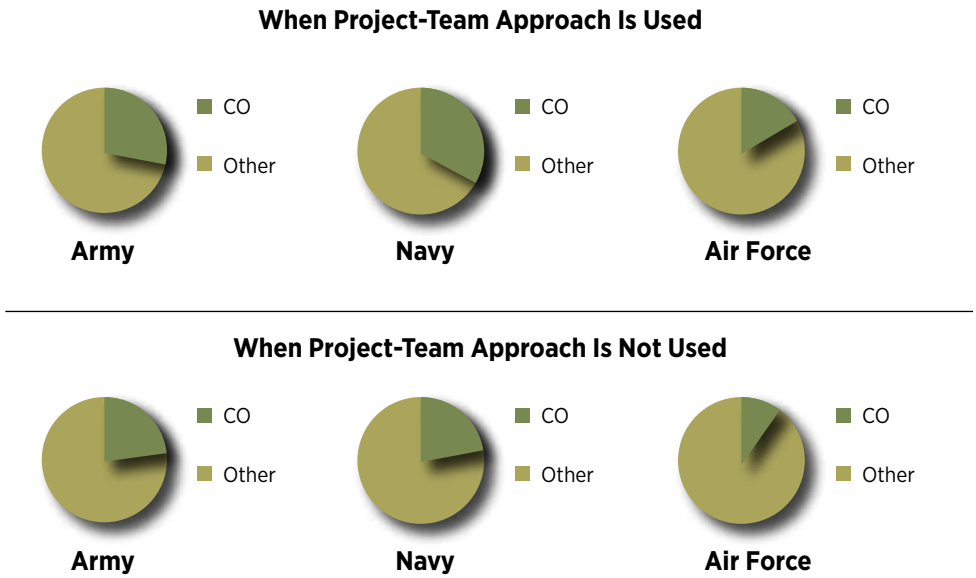
FIGURE 4. ACQUISITION LEADERSHIP



Requirement ownership. Services acquisition includes managing the requirement. The requirement is the specific service that is being procured—for example, information technology services or aircraft maintenance services. Notably, the contract management process and, more specifically, the authorities and responsibilities of the CO, do not include requirements management activities (such as determining the requirement, modifying the requirement, assessing the effectiveness of

the requirement, or terminating the need for the requirement). These requirements management authorities and activities belong to the requirements manager of the organization responsible for the service being procured. Once the requirements organization identifies, develops, and defines the requirement, the contracting organization performs the contracting activities to procure the needed service. COs, however, may support the development of the requirements documents by providing business and procurement expertise in this area. For example, an aircraft maintenance squadron would own the aircraft maintenance service requirement being procured by the contracting organization for that specific installation. Figure 5 provides data on who owns the requirements—the CO or QAE/COR.

FIGURE 5. REQUIREMENTS OWNERSHIP



In general, the practice of having a CO lead the acquisition or own the requirements is not appropriate, regardless of whether a project-team approach is used. What is surprising from the survey data shown in Figure 4 is that the project teams are frequently led by the CO as opposed to being led by a formally designated project manager responsible for the overall service project's success. We consider this finding surprising since the CO is a functional specialist concerned with ensuring

that the contractor is in compliance with the government contracting rules, while a project manager is concerned with the overall success of the project, in terms of cost, schedule, and performance objectives. In addition, a project manager typically represents the service requirement owner and is typically responsible for making technical changes to the requirement during contract performance. This does not mean that the project manager can make changes to the contract. Only authorized COs can make changes to the contract. However, COs should not be making technical changes to the service requirement and, traditionally, do not have the expertise or technical knowledge to make such changes (for example, making technical changes to the requirements for aircraft maintenance service). The role of leading project teams involves managing the requirement and authorizing related technical changes to the requirement during contractor performance. We also observed the following in Figures 4 and 5:

- As seen in Figure 4, for the Army and Air Force the use of a project team increased the probability of the CO leading the services acquisition.

- As seen in Figure 4, for the Navy, perhaps due to regional organization, the use of project teams decreased the probability of the CO leading the acquisition.

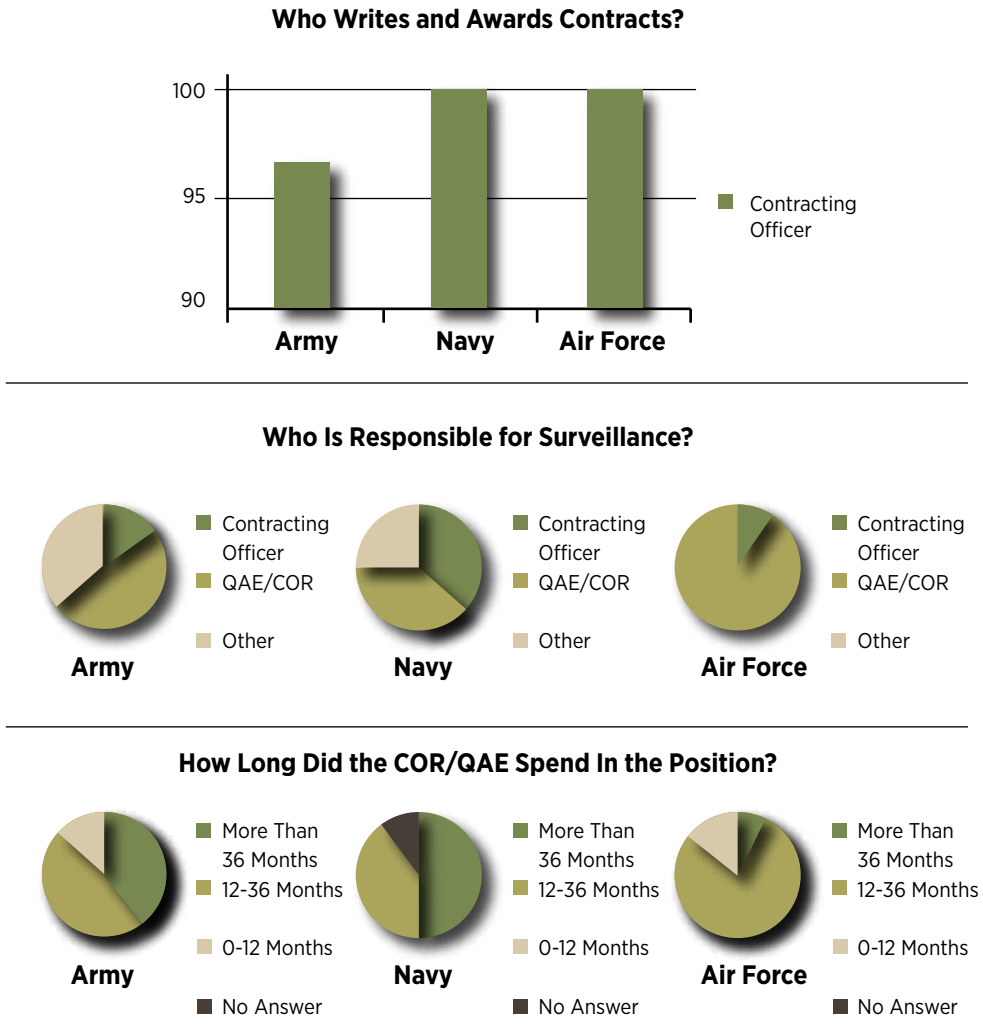
- The above two trends are also observed in Figure 5 for the requirements ownership.

Program Management Issues

The first set of program management issues we investigated was the scope and ability of personnel responsible for services acquisition. Figure 6 provides comparative data on this count.

We note in the top row of Figure 6 that, as expected, the CO always writes and awards contracts in the Navy and the Air Force. In the Army, the CO only writes and awards the contracts in 97 percent of cases. It is unclear why this is the case. One should ask who else, besides the CO, is writing and awarding contracts. It should be noted that, in accordance with the Federal Acquisition Regulation, only duly warranted COs have the authority to enter into, administer, or terminate contracts. It is unclear why the Army data would reflect that the CO awards contracts less than 100 percent of the time.

FIGURE 6. SCOPE AND ABILITY OF PERSONNEL RESPONSIBLE FOR ACQUISITION



Note. The Y Axis in the top row begins at 90 percent.

Another critical aspect of services acquisition is contractor surveillance. Contractor surveillance ensures that the contractor's performance complies with the requirements of the contract and, thus, the government is receiving the services procured. Due to the technical nature of many services contracts, contractor surveillance personnel should be knowl-

edgeable about the technical aspects of the service and be ideally drawn from the technical community responsible for the service requirement. Thus, it is critical that surveillance personal have the requisite technical skills for conducting contractor surveillance.

We note in the middle row of Figure 6 that, as expected, in the Air Force and the Army, QAE/CORs predominantly provide contractor surveillance. However, in the Navy, QAE/CORs provide contractor surveillance in about 50 percent of the cases, with the CO shouldering that responsibility in the remaining cases. These results indicate another situation in which COs may be performing activities outside their area of expertise—in this case, performing contractor surveillance. Contractor surveillance involves technical knowledge and expertise in the service requirements area. A CO, considered a business advisor with expertise in government contracting rules and regulations, should not be performing technical contractor surveillance on, for example, an aircraft maintenance service contract. Perhaps this is related to and caused by the regional approach to services acquisition being adopted by the Navy.

Finally, we studied the length of time COR/QAEs spend in their assigned position. The comparative data are presented in the bottom row of Figure 6. We note the following:

- The majority of COR/QAEs in the Air Force were assigned in the position for less than 3 years. Perhaps this is caused by significant turnover in staff.

- In the Navy, a significant percentage of COR/QAEs were in the job for more than 3 years. Interestingly, this seems to be the case in spite of the fact observed earlier that the CO is responsible for surveillance half of the time.

The final category of survey data consisted of other miscellaneous issues related to services acquisition program management. These include the use of the life-cycle approach in routine and nonroutine services, the adequacy of services acquisition billets, responsibility of various staff members, and the training given to these staff members. The comparative data are presented in Figures 7 and 8.

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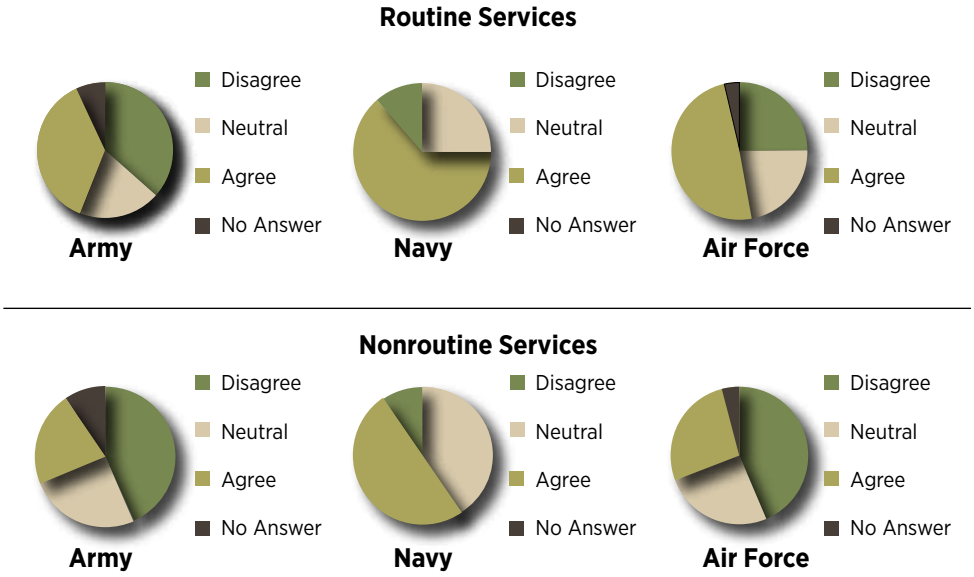
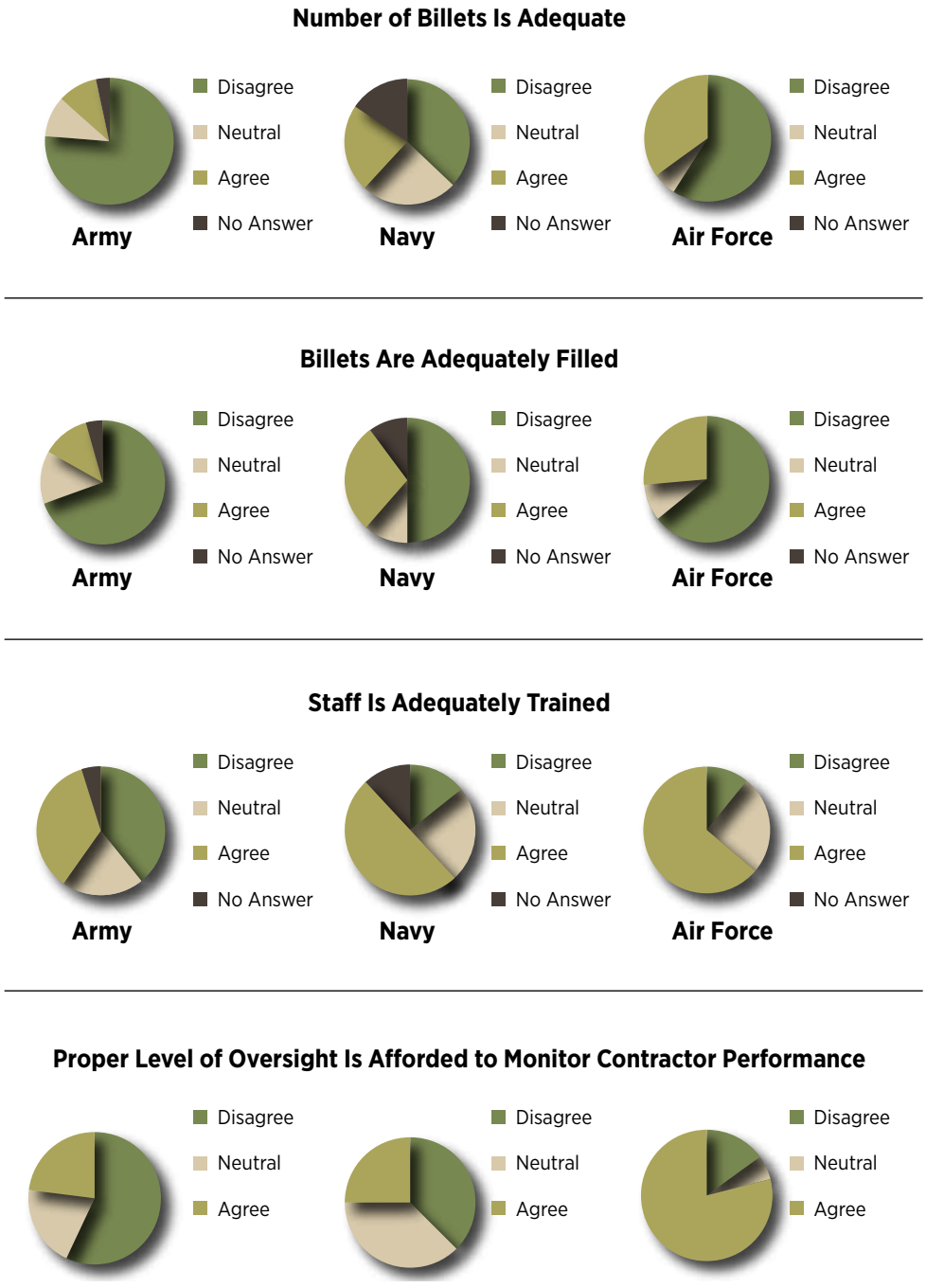
FIGURE 7. LIFE-CYCLE APPROACH



Life-cycle approach. The use of a life cycle to manage and control the progress of a project is considered a best practice in project management (Rendon & Snider, 2008). The project life cycle allows the project to be managed in phases, with each phase controlled by gates and decision points. The use of a project life cycle should be a concern for ensuring proper management of service projects, especially nonroutine services. If the services being procured and managed are of a nonroutine nature, one would expect higher levels of uncertainty—and, thus, higher levels of cost, schedule, and performance risk—in the management of these service projects. Best practices in reducing project risk include the use of a project life cycle—with project phases, gates, and decision-points for monitoring and controlling the progression of the service project procurement process as well as the resulting service. Without the use of a project life cycle, the service project may be vulnerable to excessive risk in terms of meeting cost, schedule, and performance objectives. This would especially be true in the procurement and management of high-risk nonroutine services.The top row of Figure 7 reflects that, for routine services, a life cycle was predominantly used by the Air Force, and less so (approximately less than half of the time) by the Army and Navy. As

FIGURE 8. ACQUISITION BILLETS



seen in the bottom row of Figure 7, a life-cycle approach was predominantly used for nonroutine services by the Navy, and less so (approximately less than half of the time) by the Army and Air Force.

Service acquisition billets and responsibility of staff members. The management of services acquisition is the responsibility of the services' acquisition personnel located at the regional or installation organizations. Each acquisition organization has designated acquisition positions, or billets, for its acquisition personnel. In addition, these positions may or may not be filled due to lack of personnel (perhaps personnel are deployed) or to the understaffing of organizations. These acquisition personnel are also required to receive the appropriate training reflective of their assigned acquisition duties, such as CO, QAE, or COR. Thus, having an adequate number of acquisition billets in an organization is not sufficient. These billets must be adequately filled, and the personnel filling these acquisition billets must be adequately trained. Having an adequate number of filled acquisition billets, staffed with trained acquisition personnel, is integral to providing a proper level of oversight for monitoring contractor performance. Finally, having a proper level of oversight is critically important for successful services acquisition management.

The pie-charts in Figure 8 display the survey responses for these areas. The following are salient observations on the charts:

- The top row of Figure 8 shows that the Army and Air Force predominantly disagree that there is an adequate number of acquisition billets, while the Navy survey responses were inconclusive.

- The second row of Figure 8 reveals that the Army, Navy, and Air Force all predominantly disagree that these acquisition billets are adequately filled.

- The third row of Figure 8 indicates that the Navy and Air Force predominantly agree that the services' acquisition personnel are adequately trained, while the Army survey responses were inconclusive.

- The bottom row of Figure 8 suggests that the Army predominantly disagrees that a proper level of oversight is afforded to monitor the contractor's performance; the Air Force predominantly agrees that a proper level of oversight is afforded to monitor contractor performance; and the Navy survey responses were inconclusive.

Recommendations

To improve the management of services acquisition, our first recommendation is to continue the use of fixed-price contracts, while also increasing the number of competitively awarded contracts. Fixed-price contracts promote competition, which ensures that the government gets the right services at the best value. Fixed-price contracts also shift the risk of cost overruns away from the government and onto the contractor. This also serves to incentivize the contractor to complete tasks within budget. Also included in this first recommendation is to increase emphasis on promoting full and open competition. However, it should be noted that the initiative promoted by the current Under Secretary of Defense for Acquisition, Technology and Logistics of decreasing service contracts' total period of performance from 5 years (basic plus four options) to 3 years (basic plus two options) as an approach to increasing competition may also result in some unintended consequences. Increasing the frequency of service contracts re-competition may result in

potential offerors deciding not to submit proposals for these shorter term contracts. In addition, the incumbent contractors on services contracts may be reluctant to implement continuous improvement programs given the shorter term contracts. Hence, instead of reducing contract periods of performance, another approach to increasing competition may be to take an in-depth look at the current justifications and approvals for not providing for full and open competition.

Our second recommendation relates to the management of services acquisition at the regional versus installation level. As previously discussed, each individual approach has advantages and disadvantages. In our view, the key to success under either approach is to use the proper supporting project management processes such as requirements management, designating project managers and project teams with established roles and responsibilities, and ensuring sufficient COR surveillance of contractor performance. Consequently, we recommend that the Navy adopt a more disciplined and rigorous project management approach to its management of services acquisition, possibly including a virtual project management team. This team would consist of the project manager, requirements manager, and CO at the regional office. The QAE/COR would then serve as the site manager and be responsible for contractor surveillance. The QAE/COR would act as the "eyes and ears" of the regional project manager and CO, and would coordinate program and contracting issues back to the project manager. This might require QAEs/CORs who have higher level knowledge and skills due to their expanded roles and responsibilities. The Army and Air Force's installation-level management of services acquisition should ensure consistency in services acquisition management processes department-wide. Our recommendations include the establishment of dedicated installation project managers responsible for the overall cost, schedule, and performance requirements of the services acquisition. Additionally, the installation project teams should include a requirements manager or representative who is authorized to identify, manage, and change the services requirement and submit those technical changes to the CO for incorporating into the contract. Establishing a dedicated project manager and adding a requirements manager/representative to the project team would relieve the CO from performing these conflicting roles.

Our third recommendation to improve the overall management of services acquisition is to increase the fill-rate of current acquisition billets. Over 75 percent of the respondents disagreed that the acquisi-

tion billets were adequately filled. Thus, the initial effort in increasing the Defense Acquisition Workforce should be to first fill the current acquisition billets throughout the DoD with trained and experienced personnel. Only then will the DoD be able to determine if additional acquisition billets are needed. Additionally, special emphasis should be placed on ensuring sufficient CORs/QAEs are assigned to oversee contractors' performance. Ensuring the acquisition billets are filled with properly trained and experienced acquisition personnel will allow for better oversight and will help ensure that contractor performance is properly monitored.

Our fourth recommendation is to increase the effectiveness and availability of training to ensure a qualified Defense Acquisition Workforce. Based on the results from the research, a majority of the Army respondents, and almost half of the Air Force and Navy respondents, did not agree that the Defense Acquisition Workforce was adequately trained. Respondents also provided numerous negative comments regarding the poor quality of training and the lack of training. Our recommendation is not necessarily that additional training is needed, but that more appropriate training is needed. This needed training may be in the form of experiential or on-the-job training, and localized coaching and mentoring in contracting procedures, as opposed to additional formal Defense Acquisition University classroom training. For example, current research by students enrolled in the Naval Postgraduate School MBA Contract Management program has identified that a knowledge gap exists within the Air Force contracting workforce. Based on a limited empirical survey sample of the Air Force contracting workforce, this knowledge gap reflects that the Air Force contracting workforce receives more formalized classroom training on contracting activities that are less frequently performed, and less formal classroom training related to contracting activities that are performed more frequently. Additionally, and more importantly, if the COs are to continue acting as de-facto project managers by leading the acquisition teams, then they should receive training on project management concepts, project control techniques, and project leadership.

Finally, as discussed earlier, the researchers in the fields of operations management have studied and identified several key characteristics of services that lead to differences in the production of services as opposed to manufactured products. We believe that the same key characteristics must also be taken into account in designing and managing the

processes involved in acquiring services. Given these considerations, we believe that significant opportunities exist to conduct research into the impact of these services' characteristics (intangibility, co-production, simultaneity of production and consumption, inability to store services, and complexity in defining and measuring services) on the acquisition of different service types and the associated implications for the services acquisition management process.

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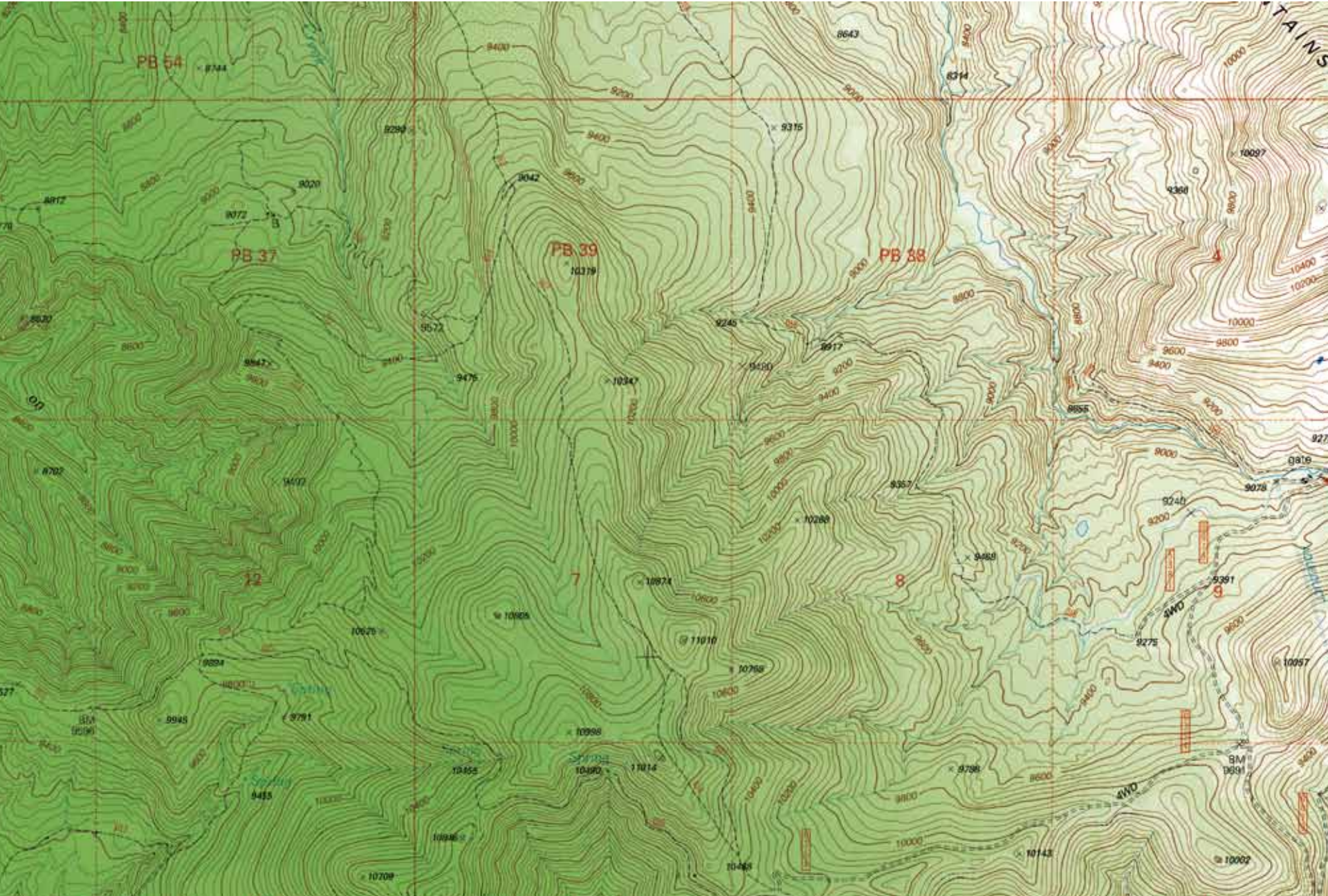
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Appendix

TABLE 1. DEFICIENCIES IN SERVICES CONTRACTING

• The government is required to conduct market research to determine the market's capability for providing the required supply or services and the government's appropriate contracting strategy for the procurement (Rendon & Snider, 2008). Reports have shown that the DoD has not conducted adequate market research during procurement planning of services contracts (GAO, 2002a; DoD IG, 2009).
• Selecting the appropriate contract type is essential to ensuring the appropriate sharing and allocation of risk between the government and the contractor. Fixed-price contracts allocate the majority of the cost risk to the contractor, while cost-reimbursement contracts provide for most of the cost risk to be borne by the government. Government reports have shown that inappropriate contract types were used in services contracts, resulting in more risk to the government (GAO, 2001; DoD IG, 2009).
• The use of project management tools and techniques, such as designated formal project managers, project teams, and project life cycles, have been considered a best practice in managing services contracts. GAO reports have shown that the DoD lacks the proper management structure and processes for managing services contracts (GAO, 2007b; DoD IG, 2009).
• Sufficient requirements management is essential for identification and development of needs for the DoD. If requirements management is insufficient, the resulting services contracts will not adequately meet the customer's needs. The GAO and DoD IG reports have identified poorly defined requirements and insufficient requirements management as problems in services contracts (GAO, 2007b; DoD IG, 2009).
• Defense contract management requires specialized skills and competencies that come from extensive training and experience. A properly trained and competent Defense Acquisition Workforce is considered the heart of successful defense acquisition management. With the downsizing of the DoD workforce, the lack of a qualified acquisition and contracting workforce to manage the increased workload in DoD services contracts continues to plague DoD services contracting efforts (GAO, 2002b; 2009b).
• The essence of DoD contract management is the proper administration of contracts and oversight of contractor performance. The lack of effective contract administration and contractor oversight increases the government's risk of not ensuring total value for the dollars spent on services contracts. The GAO and DoD IG reports have consistently identified contract administration and contractor oversight as problem areas in the management of services contracts (GAO, 2005; 2007a; 2007b; DoD IG, 2009).

TABLE 2. COMPARISON OF MANAGEMENT PRACTICES IN THE ARMY, NAVY AND AIR FORCE
(ALL NUMBERS ARE IN PERCENTAGES)

	ARMY	NAVY	AIR FORCE
CONTRACT CHARACTERISTICS (Figure 2)			
Degree of Competition			
Competitive	66	56	71
Sole Source	10	13	4
Not Applicable	24	28	25
Contract Type			
Fixed Price	66	69	71
Cost Reimbursement	8	0	4
Not Applicable	26	31	25
Contract Incentive			
Yes	9	5	8
No	91	95	92
ACQUISITION MANAGEMENT METHODS (Figure 3)			
Organization Level at Which Services are Acquired			
Regional	11	32	5
Installation	66	24	70
No Response	23	44	25
Use of Project-Team Approach			
Yes	63	51	64
No	38	49	36
ACQUISITION LEADERSHIP (Figure 4)			
When Project-Team Approach Is Used			
CO	69	56	76
Other	31	44	24
When Project-Team Approach Is Not Used			
CO	47	65	61
Other	53	35	39

1

	ARMY	NAVY	AIR FORCE
REQUIREMENTS OWNERSHIP (Figure 5)			
When Project-Team Approach Is Used			
CO	28	33	17
Other	72	67	83
When Project-Team Approach Is Not Used			
CO	22	24	10
Other	78	76	90
SCOPE AND ABILITY OF PERSONNEL RESPONSIBLE FOR ACQUISITION (Figure 6)			
Who Writes and Awards Contracts?			
CO	97	100	100
Other	3	0	0
Who Is Responsible for Surveillance?			
CO	13	38	9
QAE/COR	51	38	91
Other	36	25	0
How Long Did the COR/QAE Spend in the Position?			
more than 36 months	39	50	6
12-36 months	48	38	79
0-12 months	13	0	15
No Answer	0	12	0

	ARMY	NAVY	AIR FORCE
LIFE-CYCLE APPROACH (Figure 7)			
Routine Servlces			
Disagree	34	0	26
Neutral	18	25	21
Agree	41	63	50
No Answer	7	12	3
Nonroutine Services			
Disagree	43	0	41
Neutral	25	38	26
Agree	21	50	29
No Answer	11	12	4
ACQUISITION BILLETS (Figure 8)			
Number of Billets Is Adequate			
Disagree	74	38	59
Neutral	10	25	6
Agree	13	25	35
No Answer	3	12	0
Billets are Filled			
Disagree	66	50	65
Neutral	13	13	9
Agree	17	25	26
No Answer	5	12	0
Staff Is Adequately Trained			
Disagree	38	13	9
Neutral	20	25	21
Agree	39	50	71
No Answer	3	12	0
Proper Level of Oversight Is Afforded to Monitor Contractor Performance			
Disagree	57	38	15
Neutral	20	38	6
Agree	23	25	79

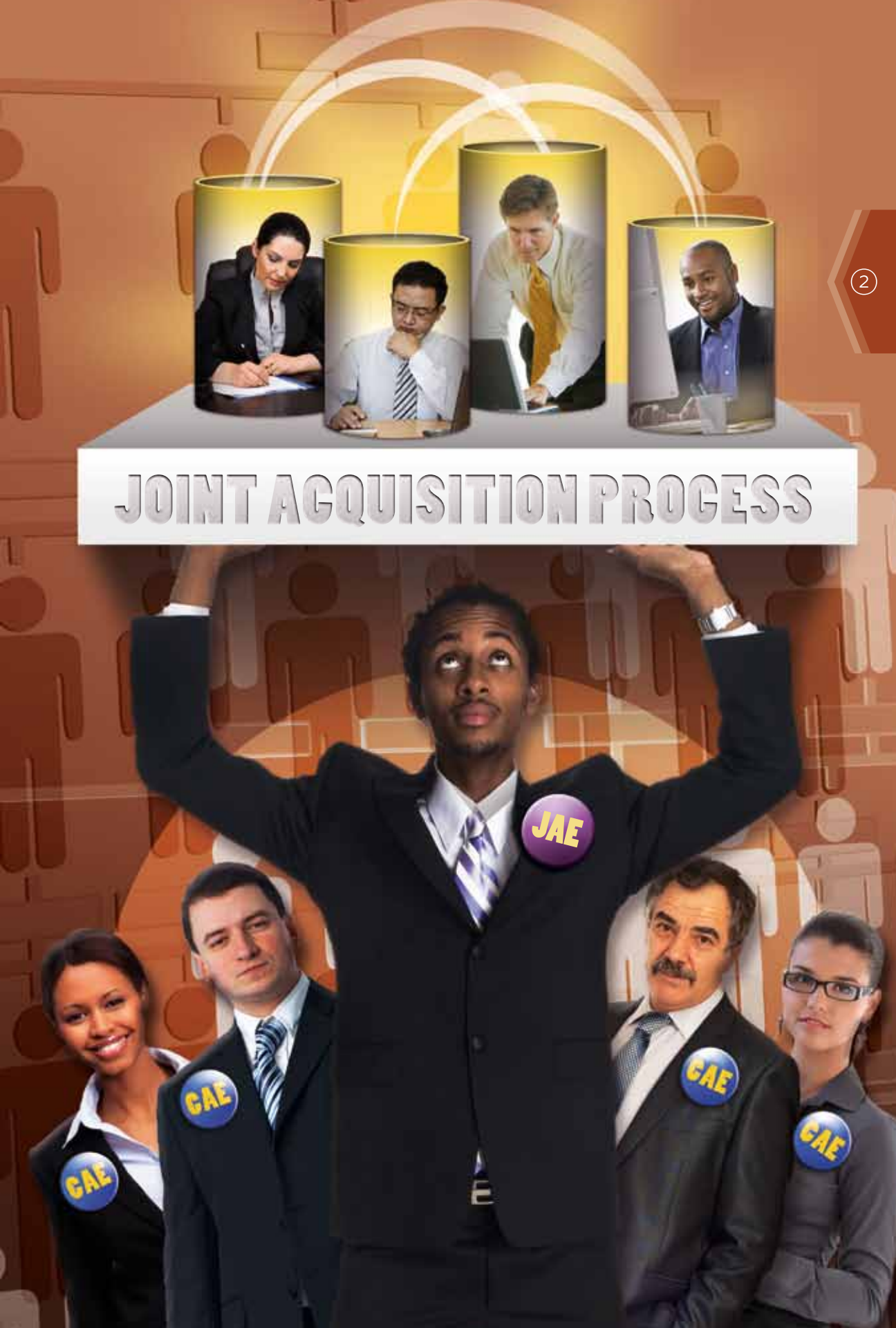
Keywords: *Joint Acquisition Programs, Joint Acquisition Executive (JAE), Component Acquisition Executive (CAE), Program Execution, Joint Advocacy*

Proposed Leadership Structure for Joint Acquisition Programs

Howard Harris and Mark Lewis

Department of Defense (DoD) acquisition programs are becoming more joint, and joint acquisition programs are critical to mission success. In the current DoD acquisition and requirements structure, joint programs are usually assigned to one of the Component Acquisition Executives (CAEs). This causes or exacerbates some of the shortfalls of the existing joint acquisition process. This article investigates the benefits and difficulties of one specific organizational change: creating a Joint Acquisition Executive (JAE), managing joint programs only and reporting to the Under Secretary of Defense for Acquisition, Technology and Logistics, as a peer to current CAEs.

image designed by Diane Fleischer »

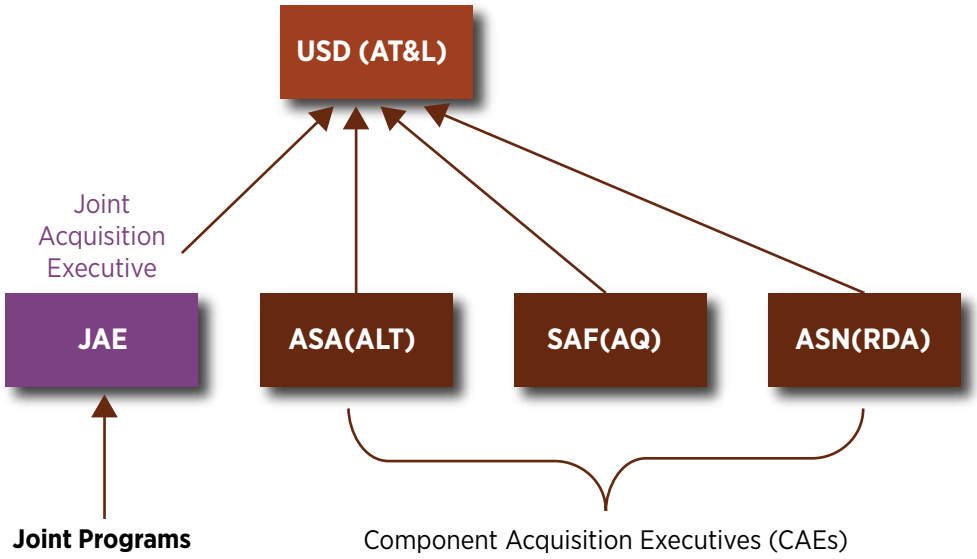


JOINT ACQUISITION PROCESS

2

Department of Defense (DoD) acquisition programs are becoming more joint, but the Department's acquisition process typically does not manage joint acquisition programs well (Defense Science Board [DSB], 2009a). Joint programs are usually assigned to one of the Component Acquisition Executives to lead and oversee. Figure 1 shows a proposed new leadership structure for some Joint Acquisition Category (ACAT) ID and IAM programs. The CAEs include the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA[ALT]); the Assistant Secretary of the Navy for Research, Development and Acquisition (ASN[RDA]); the Assistant Secretary of the Air Force for Acquisition (SAF/AQ); and the Director of the Missile Defense Agency. U.S. Special Operations Command (USSOCOM) also has an Acquisition Executive, as do the Defense Information Systems Agency (DISA) and other agencies.

FIGURE 1. PROPOSED JOINT ACQUISITION EXECUTIVE (JAE) LEADERSHIP POSITION



Background/Problem Description

The Goldwater-Nichols DoD Reorganization Act of 1986, Public Law 99-433, was enacted primarily to improve the ability of U.S. armed forces to conduct joint (inter-Service) and combined (interallied) operations in the field; and secondarily, to improve the DoD budget process. The act

contained three major changes: (a) It greatly strengthened the influence and staff of the Chairman, Joint Chiefs of Staff, compared to that of the Service Chiefs of Staff and military departments; (b) it increased the authority and influence of the unified combatant commands that control U.S. forces in the United States and around the world; and (c) it created a "joint officer" specialization within each Service to improve the quality of officers assigned to the Joint Staff. Many give the act a positive grade for the changes that have resulted in joint operations. While this act did improve Service jointness, it did not address joint acquisition. Unfortunately, significant challenges still remain including in the area of joint program acquisition (Murdock & Flournoy, 2005).

A General Accounting Office (now Government Accountability Office) Report No. GAO/NSIAD-89-158 (1989) defined joint programs as those having multi-Service or multi-Defense Agency participation during the research and development phase and/or during the procurement phase. Former Defense Secretary Robert Gates spoke of DoD's performance in the area of joint procurement (Gates, 2009):

> The Pentagon's weapon-system portfolio requires further adjustments—to better focus on joint requirements and procurement. One of the problems we have—and it's one of the reasons I recommended canceling CSAR-X [Air Force's Combat Search and Rescue helicopter program]—is that we have really come to a point where we do extraordinarily well in terms of joint operations, but we do not do well in terms of joint procurement. It is still very Service-centered. So that's an area—both analytically and in the way we conduct our business—where I think we need to do better.

Various studies catalogue other shortfalls of the existing joint acquisition process, including:

- Single-Component programs often have more senior leader advocacy (including for funding) than do joint programs;
- Execution of joint programs often exceeds cost and schedule parameters more than single-Service acquisitions;
- Joint programs often display a lack of sharing lessons learned and applying them to new joint programs;

- Joint programs often lack common program management budgeting/funding processes, and sound acquisition reporting practices; and

- Because joint programs often have many customers, the number of requirements tends to be higher than for single-Component programs. Rotating oversight of a joint program among CAEs does not enhance requirements stability.

Another shortfall is that within the DoD, no consolidated joint acquisition community exists (DSB, 2009b). Instead, the joint acquisition process is:

> ... stove-piped with departments and agencies operating within their individual silos, with the attention centered on major platforms rather than capabilities .... The stove-piped nature of the community does not well serve the needs of the combatant commanders—organizations that are by definition 'Joint.' (p. 4)

Many people working joint programs today had little or no previous training or experience in the unique aspects of joint programs, and their next acquisition billet is likely to involve only single-Component programs.

Challenges and Opportunities for Improvement

The following paragraphs group some of the challenges that joint programs face into two categories:

- Program Execution

- Oversight and Advocacy

Program Execution

Creating an organization solely to manage joint programs offers opportunities to address problems the acquisition community has failed to solve.

Schedule and cost. Joint programs often take longer (by at least one third) (Defense Acquisition University, 2004) and cost more than single-Service acquisitions. A Joint Acquisition Executive (JAE) would

manage fewer programs than CAEs do, would therefore have more time to dedicate to each program, and could be more motivated to support joint programs than are CAEs. In addition, a JAE is more likely to successfully argue for more stable funding and more realistic requirements (both of which have derailed many joint programs), which in turn would increase the probability of success.

Independent procurement. The Components have a history of developing and procuring joint capabilities inefficiently (e.g., through duplicative, competing efforts) by not working together. For example, for years the Components separately procured AN/PRC 148 JEM and AN/PRC 152 Falcon III handheld radios and accessories, but in 2007—with the help of the Joint Program Executive Office for the Joint Tactical Radio System—the Components started combining their orders to get quantity discounts. As of October 2011, the Components had saved $620 million by procuring these items jointly.

Better coordinated unity of effort. Joint programs could benefit from a better coordinated unity of effort. A JAE would manage in one organization all DoD joint programs related to a particular capability, facilitating interoperability and cross-program communication and synergy. This approach prevents Components from developing competing joint solutions, which has both positive and negative effects. For example, some negatives of a joint solution are that a single system design isn't optimized for all operating environments, and that competition for the design is limited, increasing the DoD's risk and limiting innovation.

JAE motivation and advocacy. Like USSOCOM, a JAE would also be more motivated than a lead CAE to resist parochialism and Component-unique requirements. Here, negotiating skill brings more stability to requirements and precludes the need to build Component-unique variants that add complexity, cost, and schedule. Otherwise, as responses to the survey results discussed below assert, when the requirement varies for different Services (e.g., Joint Strike Fighter), the variants may be 80 or 90 percent common, but at best there are really at least two different programs that are only "joint" by nomenclature, not in requirements or execution. Also, a JAE would be more focused on the needs of the joint user (e.g., Combatant Commander, or COCOM), while a CAE would be more likely to handle COCOM requirements through

their Service-specific lens. A JAE is more likely to reach out to COCOMs for requirements, both before program initiation and after baseline requirements have been set.

Streamlined reporting and budget/funding processes. According to the DSB (2006), "Program managers spend far too much time reporting to satisfy oversight demands and too little time managing the program." Also, the high "level of oversight leaves program managers and program executive officers only about 50 percent or less of their time to actually manage their programs" (Murdock & Flournoy, 2005). Component bureaucracy that has built up over the years slows decision making and increases the administrative burden upon the program manager. As a small, new organization, a JAE can keep this bureaucratic and administrative burden small. However, while streamlining oversight and reporting processes in the interest of efficiency is a worthwhile pursuit, the literature indicates it will not address the root causes of schedule and cost growth that plague so many acquisition programs (Drezner et al., 2007). For example, "One key misconception should be dismissed right away. While oversight by government agencies and their reporting requirements can indeed be burdensome, they clearly are not the causes of the continuing miserable record of program stretch-outs and cost growth" (Christie, 2006, p. 31).

Joint programs require more resources, people, and training. The Defense Acquisition University's *Joint Program Management Handbook* (2004) lists additional complexities joint programs face. One is that dealing with the different processes in different Components and more stakeholders causes joint programs to often require more resources, people, and training within each program office than do single-Component programs. For example, today each of the four Services could require a joint program to use their Service-unique status reporting process. In 2005, the Joint Program Executive Officer for the Joint Tactical Radio System (JPEO JTRS) addressed this issue and cut costs by providing only quarterly Defense Acquisition Executive Summary reports to the Services in lieu of previously required Service-unique reports (e.g., the Air Force's Monthly Acquisition Report, the Army's Probability of Success, and the Navy's Dashboard). Like JPEO JTRS, a JAE could establish a single set of acquisition regulations and administrative procedures for joint acquisition programs, thus relieving the burden on program managers to create their own or to adopt the lead Service standards that might have become overly bureaucratic over

the decades. Another possible problem for the joint program manager is that contracting procedures vary between the Services. Since joint programs may contract through more than one Service and may have more requirements changes than other programs, having one set of multi-Service contracting procedures would reduce the learning curve and training necessary to adhere to each Service's contracting procedures.

Oversight and Advocacy

Many have criticized the lack of hierarchical decision making and personal accountability in DoD acquisition. The axiom "when everyone is responsible, no one is responsible" is even more likely to apply to joint programs where each of the Services and other organizations has a strong voice. The result of each Service having a strong voice is that lead CAEs are less responsible for their joint programs; thus, USD(AT&L) often becomes the de facto responsible party. However, the Office of the Under Secretary is not staffed to do the necessary legwork to tee up all the decisions for the USD(AT&L)—this is a traditional role of the CAE's staff. However, in the authors' opinion, CAE staff teeing up a decision on a joint program are more likely to favor their Component's position (to the detriment of other Components and possibly the DoD) when conflict arises. Also, lead Components can have difficulty articulating and defending other Components' (i.e., joint) needs. In these cases, the USD(AT&L) becomes the first line of arbitration between the Components. The creation of a JAE appropriately pushes arbitration and synergy on joint programs to a lower echelon. A JAE—clearly responsible for resources, program execution, and advocacy (and possibly requirements)—centralizes responsibility and accountability. The JAE would report directly to the USD(AT&L), who retains oversight. For example, the JAE (instead of each Service) could submit requests for Defense Wide–Research, Development, Test and Evaluation funding directly to the Office of the Secretary of Defense (OSD), and funding could flow from the OSD Comptroller directly to a JAE Comptroller. Other Oversight and Advocacy challenges that joint programs face are discussed below.

Alignment. It is important for authority to be aligned with the chain of command. We are aware of one joint program where one Component leads the requirements development; execution-year funding gets consolidated into the funding line of a different Component; that same Component provides contracting and other administrative support; the program's leader reports to a third Component; and nobody is the clear advocate. A joint program is more likely to be successful if requirements,

funding, advocacy, and management reporting all follow the same chain; when this is not the case, OSD oversight of joint programs is strained due to OSD's other commitments and lack of staffing.

Joint program structure. DoD's acquisition community has little guidance and direction specifically for joint programs, but in some ways joint programs are managed differently from Service-centric programs. (For example, Defense Acquisition University's *Joint Program Management Handbook* [2004] discusses nine different management structures for joint programs.) A JAE could provide senior leader advocacy to ensure that DoD policies and regulations take into account the unique aspects of joint programs. Additionally, Department of Defense Instruction 5000.02 (DoD, 2008) and the *Defense Acquisition Guidebook* have little guidance and direction for the proper execution of complex and expensive joint programs.

Importance of a single point of contact. In addition, senior defense officials and the Congress may become involved in very large or well-publicized joint programs. A JAE would be their single point of contact for the programs in the JAE's portfolio—a point of contact with more accountability than an OSD principal staff assistant, for example, who often tries to perform that role.

Training and experience pays dividends. Acquisition professionals who are specialized in joint programs can reasonably be expected to be more effective in managing joint programs. Many people working joint programs today have little or no previous training or experience in the unique aspects of joint programs, and their next acquisition billet is likely to involve only single-Component programs. A prime example of where training and experience pays dividends is joint testing, which often has OSD oversight and more stakeholders, needs more joint users (for their knowledge of their Component's tactics, etc.), numerous test facilities, numerous test organizations, a distributed test environment, and separate tests of Component-unique systems or modifications. A JAE could provide funding and training development for joint functional areas (testing, logistics, contracting, systems engineering, etc.) and sponsor a new career track (Joint Acquisition) within the DoD. Creating a "Joint Acquisition" corps could broaden the workforce's knowledge of all Services' policies, processes, etc. (e.g., for operational testing), but unfortunately it could

reduce the joint acquisition team's understanding of any one Service's operating environments. This approach could trade off deep expertise for broad expertise.

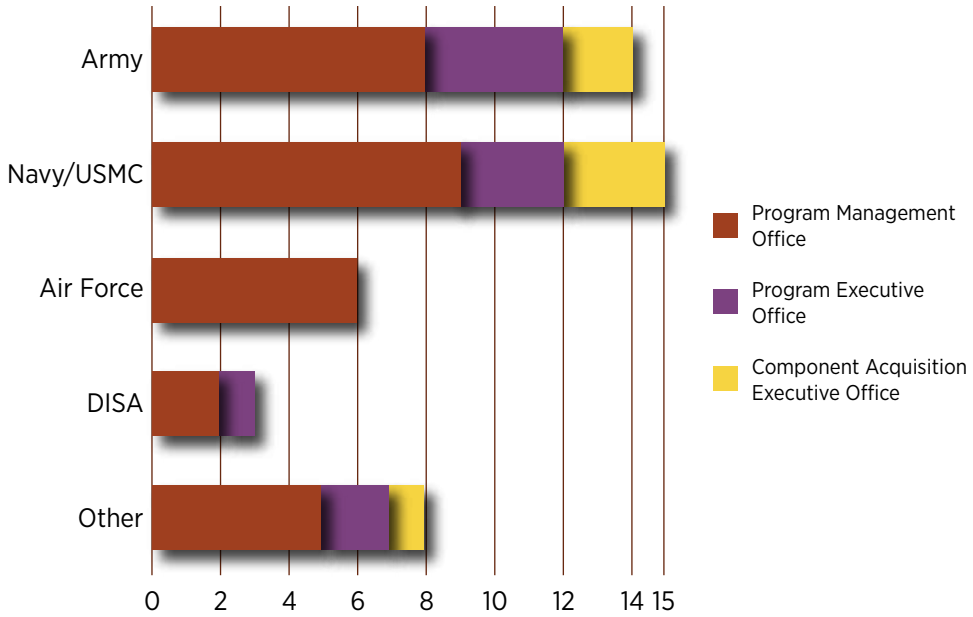
Standard selection criteria. A JAE could establish standard selection criteria for key personnel assigned to an ACAT ID or IAM joint program. Presumably, personnel selected as JAE staff would already have experience working in Service acquisition programs.

Survey Methodology

Survey Background

To gauge the joint acquisition community's support for the JAE concept, and to identify additional pros, cons, and potential pitfalls, the authors sent a survey via e-mail to current or previous joint program managers, joint deputy program managers, Joint Program Executive Office leaders, and principals and their action officers in the OSD and in CAE organizations. Figure 2 shows the respondents' distribution

FIGURE 2. SURVEY DISTRIBUTION BY COMPONENT AND LEVEL

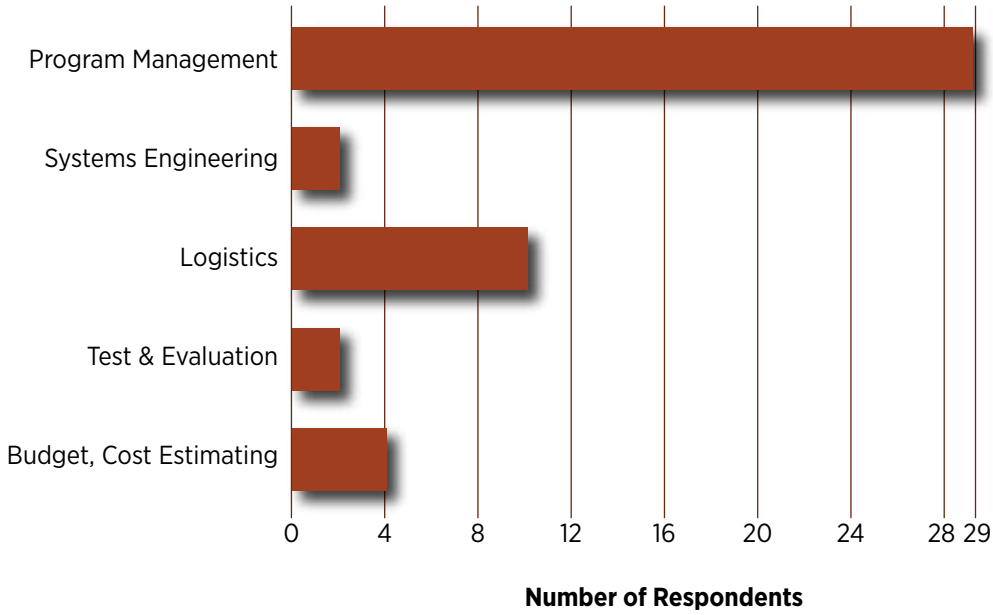


2

between the Components and between program office-level, program executive office-level, and CAE-level organizations. Forty-seven current and former government civilians and military personnel out of 170 individuals survey recipients—all known to have experience leading, managing, or overseeing joint acquisition programs—completed a Web-based survey. All but four respondents have 15 or more years of DoD experience; the median is 17 years. Twenty-eight respondents have 15 or more years in acquisition/program management; the median is 17 years. One of the 43 OSD personnel asked to participate responded.

Figure 3 shows the functional area of expertise of the survey respondents. Twenty-nine respondents listed program management as their primary functional area of expertise, followed by 10 logisticians.

FIGURE 3. FUNCTIONAL AREA OF EXPERTISE



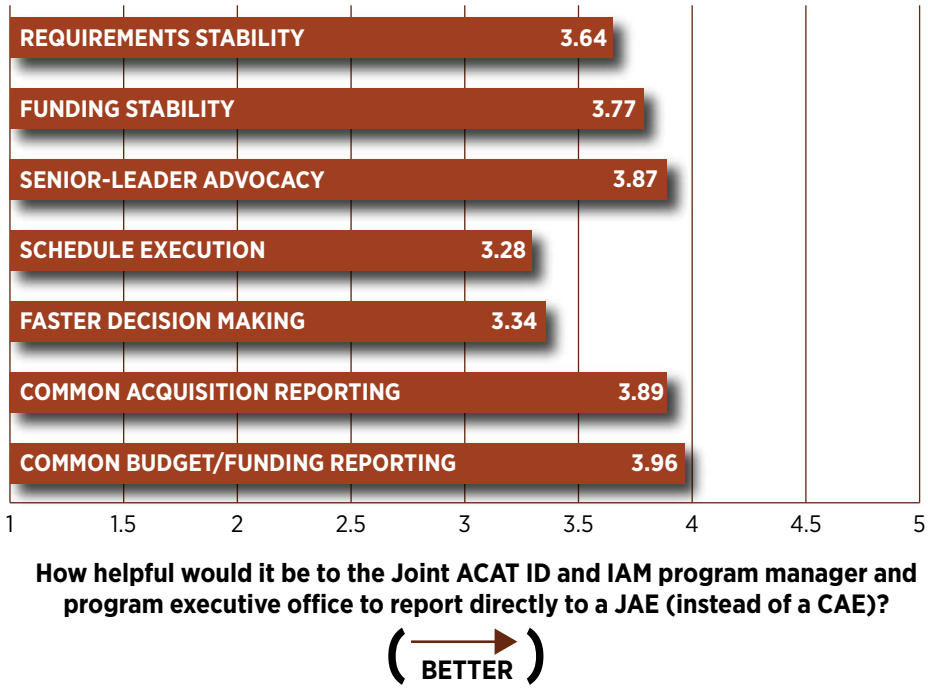
The survey gave participants five options for answering each question, ranging from "Not At All Helpful," "Neutral," to "Very Positive" (or similar terms). The scale of ranking was from one (the lowest) to five (the highest score).

Analysis & Results

Survey Findings

Figures 4, 5, and 6 provide a graphical summary of the respondents' answers and comments to the survey questionnaire. The values shown on these three figures are the averages of the respondents' rankings.

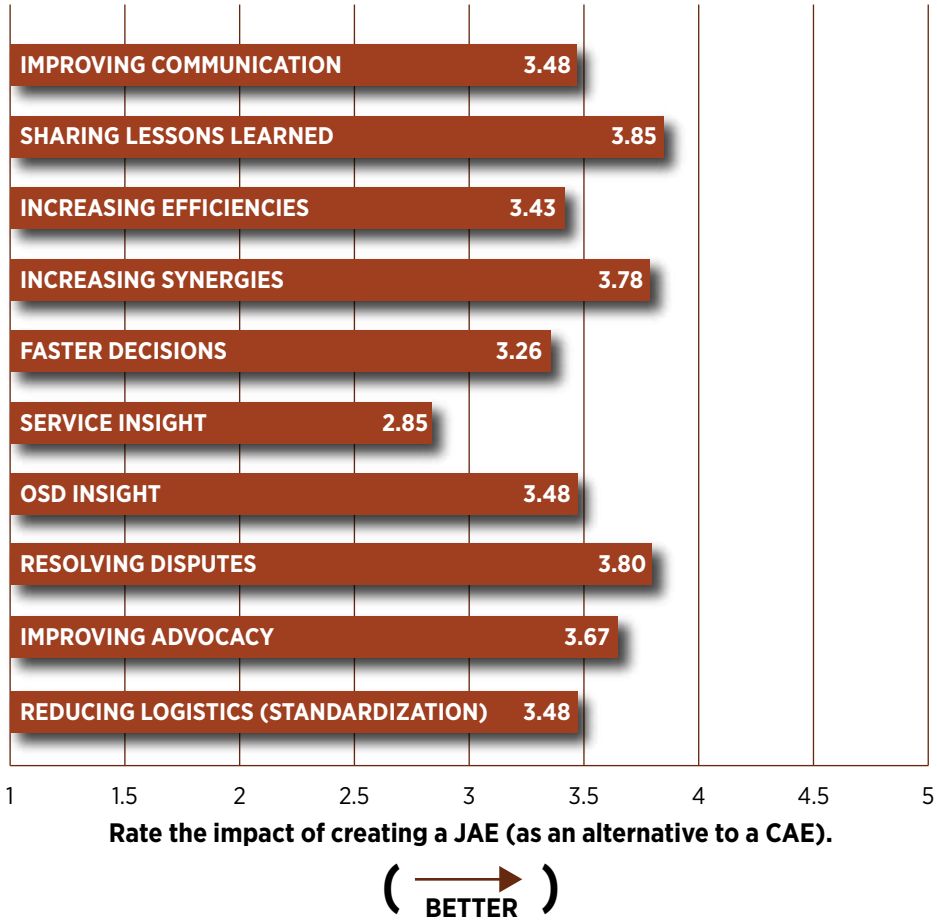
FIGURE 4. DEGREE OF HELPFULNESS TO PROGRAM MANAGER AND PROGRAM EXECUTIVE OFFICE



The strongest responses were that reporting through a JAE (instead of a CAE) who oversees joint ACAT ID & IAM programs would be helpful or very helpful for joint programs' (a) common budget and funding processes, (b) common acquisition reporting, and (c) senior-level advocacy, in that order. The authors were somewhat surprised with the lower ranking of faster decision making because we envisioned the JAE organization to be small and less bureaucratic. If the JAE has a small enough portfolio of programs, there would be little need for program executive officers between the program managers and JAE, thus speeding decision making.

2

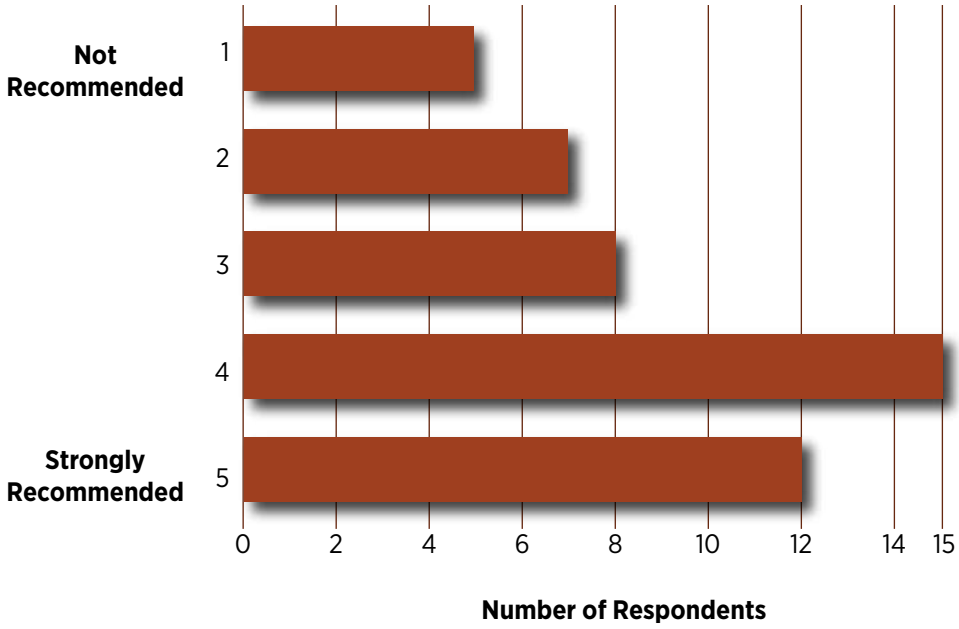
FIGURE 5. DEGREE OF IMPACT TO PROGRAM MANAGER AND PROGRAM EXECUTIVE OFFICER



Participants expressed that creating a JAE would (a) increase the sharing of lessons learned and best practices unique to joint programs (responses to this question generated the tightest standard deviation); (b) assist in arbitrating for joint programs in resolving disputes between the Components; and (c) increase synergies of joint programs.

In only one area of the survey did participants clearly believe that a JAE would do more harm than good: Component Insight into Joint Programs. This could be because a specific Component has deep insight into the joint programs it is already managing; and for joint programs

FIGURE 6. SUPPORT FOR ESTABLISHING A JAE TO OVERSEE SOME ACAT ID AND IAM JOINT PROGRAMS



managed elsewhere, the Component already has some mechanisms (personal relationships, formal processes, etc.) to get some level of insight. It would take time to establish those mechanisms in a JAE organization.

Most participants in the survey recommended that a JAE be established, anticipated that a JAE would be effective or very effective in fielding joint capability, and anticipated that there would be significant benefits to the DoD (though not necessarily to every Component) to creating a JAE. Several mentioned USSOCOM's acquisition organization as a model. One participant pointed out that a JAE is more likely to be effective for certain types of technologies (for example those in which the JAE staff has expertise) and where there are fewer Component-unique legacy systems with which to interoperate. However, 13 respondents cautioned against the idea, believed the necessary political and cultural changes are unlikely, or expressed doubt that the DoD would execute a JAE effectively. They raised these specific concerns:

2

Added level of bureaucracy. Even with a JAE, the CAE staff would still need or want to be involved. In this case, and especially if the JAE or OSD does not control the funding, the JAE would be an additional level of bureaucracy (one participant mentioned Joint Forces Command as an example of a level of bureaucracy added without removing any previous levels). This was one of the most often voiced concerns.

Obtaining buy in. Obtaining buy in from the Components and OSD organizations on the new roles and responsibilities would be challenging. This was a common theme.

Insufficient Component advocacy. A JAE would lack sufficient Component advocacy for funding, causing instability. Budgeting would still be done by each Component (e.g., via a cost sharing agreement) rather than jointly, and the Components would still engage in budget gamesmanship to avoid losing funds to joint programs.

Little impact on requirements stability/Component-unique requirements. A JAE would have little impact on requirements stability and little power to prevent the inclusion of Component-unique requirements. This could increase system complexity, increasing cost and schedule.

No impact on parochialism. Component differences and disagreements that impact joint programs are due to Component cultures and requirements; a JAE would not change this. Parochialism will still be alive and well.

Who's in charge? Components like to be in charge of the program to ensure their requirements are met.

Levels of inaction. A JAE organization would get bogged down by "all the action officers and staff" in the Components. One respondent cautioned, "Now we spend so much time educating staff members that by the time we get to the decision makers, we've been beaten and badgered."

Redundancy. A JAE organization would likely perform functions redundant to those in the Components, weakening any cost efficiency or synergy arguments. "I see huge turf battles," said another.

Anomalies overlooked. A JAE would not pay sufficient attention to the fielding and logistical anomalies of the individual Components.

Staffing the JAE organization. For example, at the present time Congress is pressuring the DoD to decrease the number of Senior Executive Service and Flag/General Officer billets, but new billets would be created under a JAE.

We recommend at the end of this article that the DoD further study the concerns discussed in this section and consider creating a JAE.

Conclusions

The existing joint acquisition process has many shortfalls (e.g., too Service-centered, less senior-level advocacy for joint programs than for single-Component programs, lessons are not adequately communicated among joint programs), but JAE oversight of joint programs might have advantages over CAE oversight in addressing these shortfalls. A sample of practitioners of joint acquisition in the DoD Components tends to

believe that creating a JAE would help program managers and program executive officers better manage Joint ACAT ID and IAM programs, particularly in the following areas:

- Common budget and funding processes;
- Common acquisition reporting;
- Senior-level advocacy;
- Increase in sharing lessons learned and best practices unique to joint programs;
- Assistance in arbitrating for joint programs in resolving disputes between the Components; and
- Increase in synergies of joint programs.

Survey participants believed that creating a JAE would hurt Component insight into joint programs and raised other concerns, especially that:

- The JAE would be an additional level of bureaucracy and that no current levels would be eliminated; and
- Obtaining buy in from the Components and OSD organizations on the new roles and responsibilities would be challenging.

In the next section we identify topics OSD should study in more detail before considering creating a JAE.

Recommendations

JAE oversight of joint programs might have advantages over CAE oversight and deserves further study by OSD. We recommend that such studies focus on the following:

- The potential of a JAE to move the DoD further from Service-centric procurement and closer to joint-centric procurement;

- Defining the scope of the JAE's portfolio of programs to increase unity of effort and interoperability (i.e., managing within one organization all DoD joint programs related to a particular capability or focusing on acquiring Service-neglected joint capability requirements);

- Ensuring the JAE has clear responsibility and accountability for resources (possibly via defense-wide funding), program execution, and advocacy (and possibly requirements);

- Changing roles and responsibilities of the Components and OSD organizations in their oversight and management of joint programs;

- Giving the JAE responsibility for establishing and operating a new process to collect and synthesize COCOM requirements (and providing COCOMs analytical assistance to more fully engage in the Joint Capabilities Integration and Development System before handing those joint requirements to its acquisition arm);

- Offsetting the cost of establishing and staffing the JAE by cutting redundant functions and staff in the Components;

- Offsetting the additional layer of oversight by relieving the JAE's programs of oversight and bureaucracy elsewhere (possibly by eliminating program executive officers between the program manager and JAE);

- Estimating the number and experience of personnel needed to staff the JAE organization, and creating new joint billets for civilians and military personnel;

- Determining what legislative changes, if any (e.g., authorizing a JAE to equip forces, instead of only the Services) would be necessary; and

- Investigating USSOCOM as an effective model for a JAE.

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Keywords: *Experience Catalysts, Defense Acquisition Workforce Improvement Act (DAWIA) Training, On-the-Job Training, Experiential Learning, Scenario-Based Learning*

Experience Catalysts:

How They Fill the Acquisition Experience Gap for the DoD

Col Robert L. Tremaine, USAF (Ret.)

In any business, trade, or profession, experience matters. Not surprisingly, the public tends to look at experience as a necessity when personal safety is paramount. Professions like the medical, transportation, and construction industries all rely heavily on experience. They take considerable time to qualify their respective corps through various experience incubators like internships, fellowships, apprentices, etc.—all on the job. They learn by "doing." Without "doing," these personnel may face challenges later they cannot easily overcome when "know-how" matters the most. The defense acquisition profession is no different. Experience has always been a vital constituent component. This article addresses the experience catalysts that matter most to the Defense Acquisition Workforce.

image designed by Diane Fleischer »

On The Job Training
Challenging Work
Knowledge sharing
EXPERIENCE
CATALYST

For practical reasons, many professions use quantitative measures such as "hours" or "years" to measure the experience levels of their employees. Such measures not only give these trades more confidence, but also give the public more confidence. Assured and demonstrated competencies are universally recognized as a vital necessity since inexperience could lead to life threatening consequences. Many of these same professions are backed up by licensing (or certification) boards coupled with front-line experts focused on maintaining minimum standards.

For example, after passing their medical boards, burgeoning surgeons spend years of internship practicing their craft under the watchful eye of experienced surgeons before they ever get sanctioned as qualified surgeons. Entry-level military and commercial airline pilots must achieve a minimum number of successful flight hours under variable operating conditions before they can climb into the far left seat as qualified pilots-in-command. In general, fundamentals like educational achievement, aptitude, previous job performance, etc., serve as initial career screening mechanisms. But, are there any innovative experience-producing methodologies or modalities that can appreciably accelerate experience or shrink the time it takes to achieve it?

If so, many professions including the Defense Acquisition Workforce could benefit since their certification levels rely heavily on experience. Twenty-one years after the Defense Acquisition Workforce Improvement Act (DAWIA) of 1990 became law, experience is still an essential component. If its importance becomes minimized, experience shortcomings would invariably surface and could delay the fielding of indispensable weapon systems. Now is the time, with the federal government's current wave of retirements and impending significant budget cuts, to take a closer look at the experience variables in the acquisition workplace performance equation. Essentially, it's time to answer the question: Acquisition experience gaps—what matters and what does not?

Method

This investigative effort used a phenomenographic methodology (i.e., aggregate views drawn from personnel experiences) by surveying a wide range of acquisition professionals (e.g., program managers; systems engineers; logisticians; contract specialists; and budget, cost estimators, and financial managers) in various product lines (e.g., ships, tanks, aircraft, satellites, munitions, information warfare, etc.) and services

(e.g., information technology, research, security, etc.), and their views on experience catalysts. Answers to these survey questions would confirm the key experience solutions that fortify the professional acquisition corps' capabilities and combat the uncertain and sometimes turbulent and impending programmatic challenges.

The survey separated experience catalysts (EC) into three tiers: *Foundational* (Tier 1), *Enhancers* (Tier 2), and *Accelerators* (Tier 3). Isolating ECs in this way, the surveyors believed, might give way to a more definitive analysis later. Ultimately, this partition could also help explain experience gateways and validate the prevailing obstacles (real or artificial) that could be interfering (in the form of barriers) with experience gains along the acquisition "experience building" pathway. The total sum of these factors would look something like the equation shown here:

$$EC = \sum_{i=1}^{n} (\text{Tier } 1_i + \text{Tier } 2_i + \text{Tier } 3_i) - \text{Barriers}_i$$

Findings

A total of 1,414 Defense Acquisition Workforce personnel (1,236 government, 152 military, and 26 support contractors) responded to this survey. The results reinforced both the importance and influence of a wide range of experience catalysts operating inside and outside the workplace. However, the data exposed a few that were not operating at expected levels and also generated several "Aha!" moments.

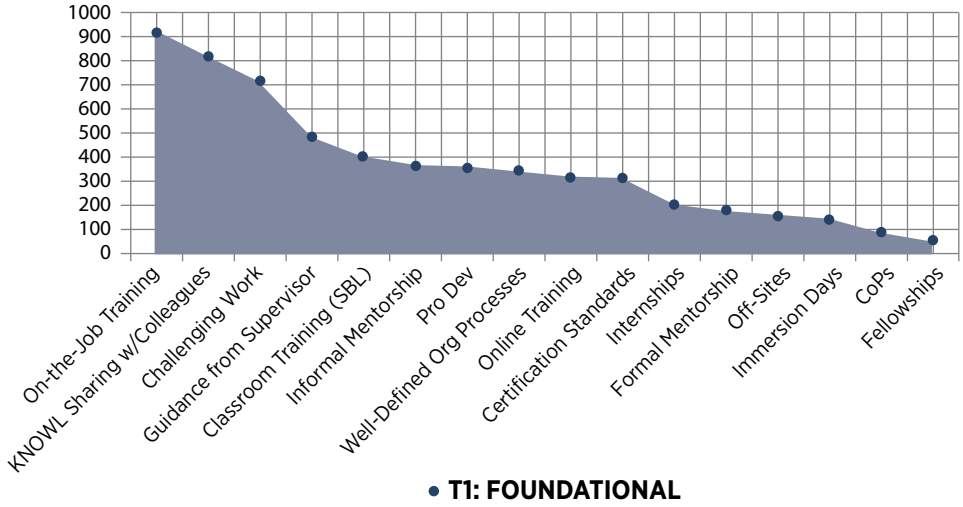
1st Tier: Experience *Foundational*

Inarguably, many professions rely on enduring academic *foundations*. Depending on the specific functional area(s) a member of the Defense Acquisition Workforce chooses to pursue, these academic foundations also serve as *formal* learning toll gates before personnel arrive *on the job*. Of course, well-described job competencies reinforced by definitive performance expectations ensure that personnel are properly placed and appropriately guided. Systems engineers should be ready to apply engineering basics; contract specialists should be ready to carefully evaluate written agreements; and cost estimators should be steeped in math sufficient to comfortably work with budget and cost estimate equations.

Despite the profession, however, these *formal* foundational learning gates are less than half of the total learning equation. The remainder actually occurs at the workplace. In fact, more than 70 percent of most new knowledge and skills actually take place at work through a combination of *informal* and *incidental learning* (Good & Brophy, 1990). This is where the workforce tests their inherent capabilities every day. Where do these foundational experience catalysts play in all of this? They appear to take root more in the context of these informal and incidental learning methods (i.e., "learning by doing"). If so, what did the Defense Acquisition Workforce actually say about the effectiveness and value of these foundational experience catalysts early on while actually working "in" the job? What mattered most?

The survey respondents rated the importance of a broad range of experience factors. As Figure 1 indicates, the results were consistent with previous research. *On-the-job training* mattered the most. *Knowledge sharing* with colleagues and *challenging work* trailed very closely behind. Several respondents expressed that "learning and understanding others' experiences reinforced their own." Not surprisingly, *knowledge sharing* can have far-reaching considerations since knowledge is seen as "the most strategically important resource which organizations possess and a principal source of value creation" (Cummings, 2003).

FIGURE 1. T1: FOUNDATIONAL



Supervisory guidance represented the next data point. One respondent echoed the views many others shared. She claimed that "having a well-trained supervisor who is a great teacher, allowing me to fly semi-alone ... built [my] confidence, knowledge, and courage to complete more challenging tasks." The next lower grouping included *DAWIA classroom training, formal mentorship, professional development, well-defined organizational processes, online training,* and *certification standards*. Unexpectedly, three of these seven data points (*DAWIA training, well-defined organizational processes,* and *certification standards*) all scored noticeably low and could be explained for several reasons.

Probable reasons why survey respondents gave *DAWIA classroom training* a low score:

- *DAWIA classroom training's* value could be muted compared to other more dominant experience catalysts. Some respondents expressed that classroom experience will "never be able to replace OJT [on-the-job training], mentoring, or knowledge sharing at work." Others emphasized that *DAWIA classroom training* is "rather generic and does not actually teach enough of the job specifics."

- Students might be showing up too early (or late) for training during their career. Several respondents noted the difficulty in keeping up with additional training demands.

- Students forgot what they learned before they could apply it.

- *DAWIA classroom training* could possibly have a looser connection to experience in its current form.

- The benefits of *DAWIA classroom training* might not be well-understood, especially the connection to performance outcomes.

In a recent report, the U.S. Government Accountability Office (GAO) declared that without appropriate outcome metrics, acquisition, technology, and logistics programs will be "unable to demonstrate how certification training actually contributes to organizational performance results" (GAO, 2010). What the GAO underscored is tough to demonstrate without a comprehensive program that tracks behavioral changes at

work. The discovery that as much as 90 percent of training resources spent on the design, development, and delivery of training events yield application results of only 15 percent (Brinkerhoff, 2006) makes training an easy target for scrutiny.

In the context of Donald Kirkpatrick's well-known Four Levels of Learning Evaluation, the first two learning levels (Reaction [1], and Learning [2]), have been relatively easy to demonstrate during the classroom delivery timeframe. Level 3 (Behavior) and Level 4 (Results) have been a lot tougher to confirm. Some researchers assert that if Level 3 evaluations were conducted as part of existing career development and performance reviews, then it might "improve, explain, control, and predict performance although managers must be willing to observe, document, and evaluate the desired behaviors" (Mayberry, 2005). Even "modest supervisor involvement before and after the training can have a significant impact on whether trainees use their newly developed skills" (Bassi and Russ-Eft, 1997). Other studies have shown that "the more managers are trained in how to support and coach the skills their employees learn, the more those skills will be used and sustained in the workplace" (Leimbach & Maringka, 2009).

Decades ago, the DoD instituted a formal performance evaluation program for all its employees to signal the importance of training. In 1958, legislators more than likely expected that the Government Employees Training Act would improve performance and prepare personnel for future advancement (Government Employees, 1958). In 1962, the subsequent Federal Salary Reform Act required an acceptable level of competence determination for granting General Schedule within-grade increases; provided for the denial of the within-grade increase when performance is below the acceptable level; and authorized an additional step increase for high-quality performance (Federal Salary, 1962). While these formal evaluation measures have continued to evolve, they have not, however, specifically traced personnel performance to training activities. Educators have generally assumed that training focuses on the required knowledge, skills, and abilities (KSA) necessary to perform and improve assigned duties within the workplace. In fact, plenty of literature substantiates this probabilistic connection. However, many other intervening factors complicate the relationship including individual attitude, motivation, cultural realities, learning self-efficacy, age, etc. (Bassi and Russ-Eft, 1997). Making a deterministic forecast is difficult.

Other factors including team structures, incentives, use of analytic tools for capturing and analyzing information, and psychological safety tend to moderate the association between experience and performance improvement (Edmondson, 1999). Nonetheless, the private business sector has found training to have a positive impact on profitability (Cosh & Hughes, 2003, pp. 88–95.). Many years ago, the DoD made a similar association for its Defense Acquisition Workforce and invested heavily in training.

As far as experience foundational catalysts go, several others require further introspection.

Probable reasons why survey respondents gave *well-defined organizational processes* a low score.

- Organizational processes may already be culturally embedded and not viewed as a distinctive element.
- Organizational processes may not represent much value and are not enforced.

Probable reasons why survey respondents gave *certification standards* a low score.

- The *Certification Standards* could be generally misconstrued.
- The *Certification Standards* did not go far enough or were too watered down to be significant.
- The *Certification Standards'* connection to job performance was not readily apparent.

Probable reasons why survey respondents gave *Communities of Practice (CoP)*—another form of *knowledge sharing*—a low score.

- The CoP website is not a rich source of useful knowledge.
- The information posted on the CoP *website* is not current.
- The existence of a CoP website is not well known.

- Information on the *CoP* website may not be appropriately curated (e.g., information has not been properly maintained or trusted for use).

- The *CoP* website could represent a loss of social interaction that generally creates more value.

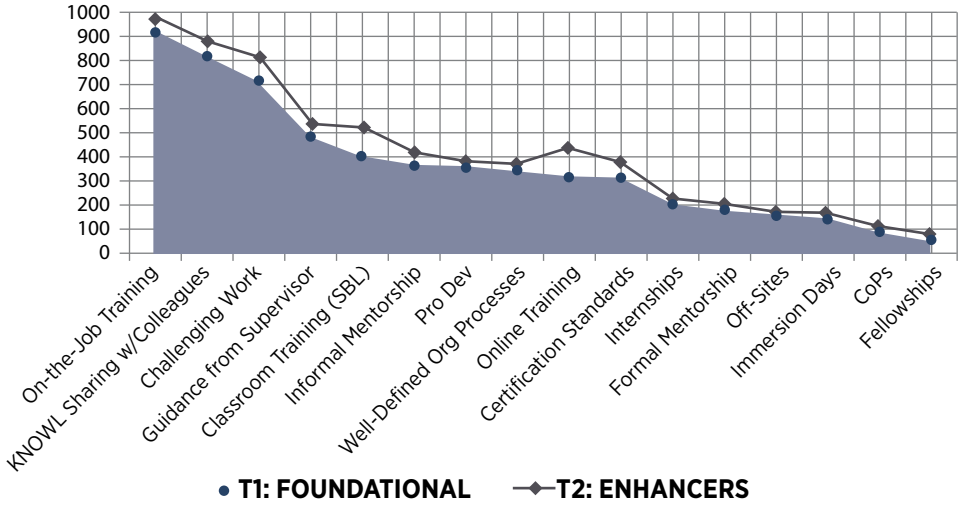
2nd Tier: Experience *Enhancers*

The impact of experience catalysts expressed as experience enhancers (T2) seemed relatively consistent to those described as foundational (Figure 2) and were very closely correlated. *On-the-job* training didn't diminish in importance; neither did *knowledge sharing*, *challenging work,* or *supervisory guidance.* In relative terms, they all rose slightly.

Both *classroom training* and *online training* rose more noticeably in relative terms. The uncharacteristic rise in online training could be attributed to: (a) how online training complements certain experience foundations; or (b) the presence of more effective delivery methods (e.g., greater interactive modalities and less of a "page turner"). Traditionally, *DAWIA classroom training* that uses Scenario-Based Learning (SBL) methods enjoys more of an advantage than other classroom methodologies for students with relevant job experience (Clark, 2009, pp. 84–85). It gives students a chance to practice representative training scenarios alongside their peers, and reflect *about* their jobs while they are *away* from their jobs. Reflection and practice have been found to have a significant impact on experiential learning of this kind.

David Kolb, an American educational theorist, reported that in order to gain genuine knowledge from an experience, the learner "must be able to reflect on the experience as well as be willing to get actively involved in the experience; possess and use analytical skills to conceptualize the experience; and possess decision-making and problem-solving skills in order to use the new ideas gained from the experience" (Kolb, 1984). Classroom training that employs this type of SBL does just that and today is used extensively since it adheres to a performance improvement imperative rather than just the acquisition of knowledge and skills. SBL also promotes defining moments by exposing an individual's strengths and weaknesses. By imitating something real, SBL has been shown to pay unmistakable experience dividends by igniting the senses. SBL has

FIGURE 2. T1 (FOUNDATIONAL), T2 (ENHANCERS)



already found its way into organizations that vitally depend on training. Soaked with real-world conditions, SBL tests an individual's ability to demonstrate how certain critical competencies prevail (or not).

Captain Chesley "Sully" Sullenberger III, a former U.S. Airways seasoned pilot, experienced its value first-hand. He spent the better part of two full days every six months at the controls of an Airbus 319 flight SBL simulator while several lifetimes' worth of disasters broke loose around him (Budiansky, 2009). At what point was he prepared for a water landing on the Hudson River when he piloted Flight No. 1549 on January 15, 2009? How many years did it take for him to turn a potential disaster into a miracle? He met his flying experience markers (in years), but up to the moment before he set his aircraft on the Hudson, an SBL simulator allowed him to fly at the edge of the flight envelope and test him for just about any contingency—except a water landing. The Airbus 319 isn't a watercraft, but Sully knew he had to treat it like one given the threatening outcome of two failed engines. His many years as an experienced "line" pilot combined with recurring scenario-based simulator training helped him tackle "the unexpected" and ultimately save 155 lives that day.

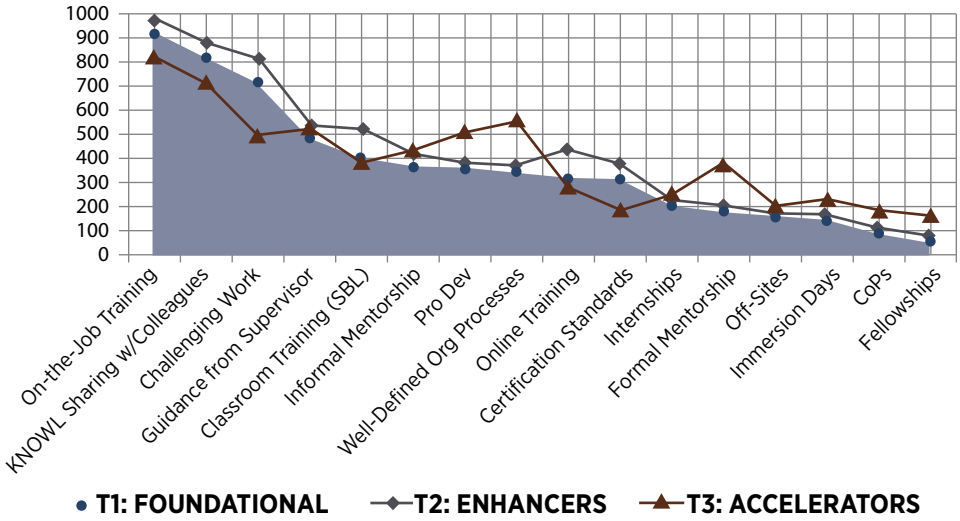
Aside from their longstanding presence in the flying community, simulators also show promise for many other professions that require continuous practice and steady reinforcement. Virtual simulators were

previously an expensive proposition. Not anymore. Now, high-fidelity virtual simulations and the introduction of gaming using 3-D capability are relatively inexpensive and widespread. They could eventually become commonplace in many workplace settings. When that occurs, they might have an even greater impact on experience gains for many professions where workers can safely practice a wide range of challenges preloaded with uncertainty, but customized to their respective *on-the-job training* settings.

3rd Tier: Experience *Accelerators*

The data associated with this last tier resulted in several interesting observations. First, fewer correlations were noted with 1st and 2nd tier factors. Second, *professional development, well-defined organizational processes,* and *formal mentorship* took a marked leap in importance as accelerators (Figure 3). Third, *challenging work* and *certification standards* took visible dips. What caused certain experience catalysts to rise in importance and others to fall?

FIGURE 3. T1 (FOUNDATIONAL), T2 (ENHANCERS), T3 (ACCELERATORS)



Probable reasons to explain why the T3 experience factors rose in importance.

- *Professional development.* This factor rated off-the-job training and the potential knowledge gains found outside the workplace on supplementary/complementary subjects and/or interactive *knowledge sharing* venues with leaders in their same fields.

- *Professional development opportunities.* This factor rated the importance of interacting and *knowledge sharing* with colleagues outside the workplace.

- *Well-defined organizational processes.* This factor rated tangible benefits of more definitive written organizational guidance that might have been less obvious before. Research has shown that learning from direct experiences depends critically on organizational processes that generate experiences (Schultz, 2001).

- *Formal mentorship.* This factor rated the importance of personnel seeking advice and counsel from more seasoned professionals in their same career fields in their own work environment. One respondent commented that "having a hands-on mentor made a world of difference." Another stated that "having a hands-on mentor at the start of their career would have made a world of difference."

Probable reasons to help explain why some T3 experience factors dropped in importance.

- The dip in *challenging work* could be attributed to three probable causes:

    - The work at hand may no longer be challenging enough and could be holding people back.

    - Work overload—good work is rewarded with more work without the time to adequately learn it.

- A complicating effect of increased administrative burden (seen by some as busy work) is too much sidebar work to promote any real preferential experience gains.

- The dip in *certification standards* (and the lowest of all experience accelerators) could also be attributed to three probable causes:
  - The *certification standards* contain poorly described benefits—professional and personal payback are not readily apparent.
  - Achievement thresholds are too low or less relevant to current jobs.
  - Certification levels were awarded too long ago and are less relevant today.

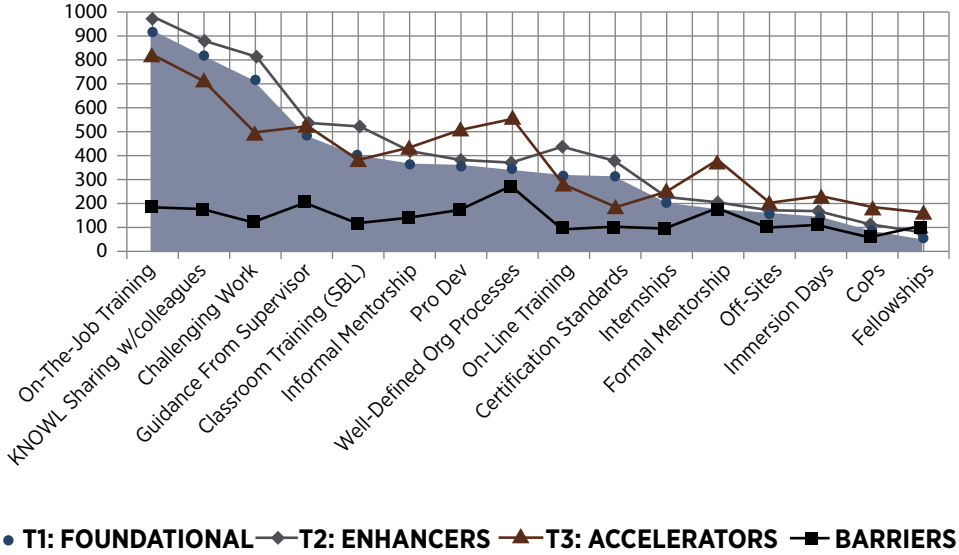
Barriers

To understand their views of experience barriers, the survey respondents were asked to comment on the lack of or reduction in certain experience catalysts. As Figure 4 shows, the barriers followed a close inverse correlation to experience accelerators. These barriers did not necessarily predominate, but they did seem to induce a certain experience drag.

The lack of *well-defined organizational processes* (also seen as an experience accelerator when visibly present) was the most prominent and could be attributed to:

- Outdated processes no longer applied.
- Support was reduced for existing organizational processes.
- Ambiguity surrounded the issue of whether certain key organizational processes even existed.
- Guidance was poorly conveyed, without adequate explanation or appropriate justification. One respondent stated that the lack of published work processes curbed his experience gains.

FIGURE 4. T1 (FOUNDATIONAL), T2 (ENHANCERS), T3 (ACCELERATORS), BARRIERS



The lack of *formal mentorship* (also seen as an experience accelerator when visibly present) emerged as a barrier, suggesting that some personnel require more coaching.

The lack of participation in *CoPs* was neither a barrier nor considered a substantial experience factor in any one of the three tiers. While *CoPs* can give access to a tremendous set of colleagues steeped in relevant knowledge and experience, they appear to have less of an impact on experience growth than expected.

Certification standards were not seen as a barrier, suggesting that the workforce did not necessarily view them as inhibiting experience gains or helping to achieve them.

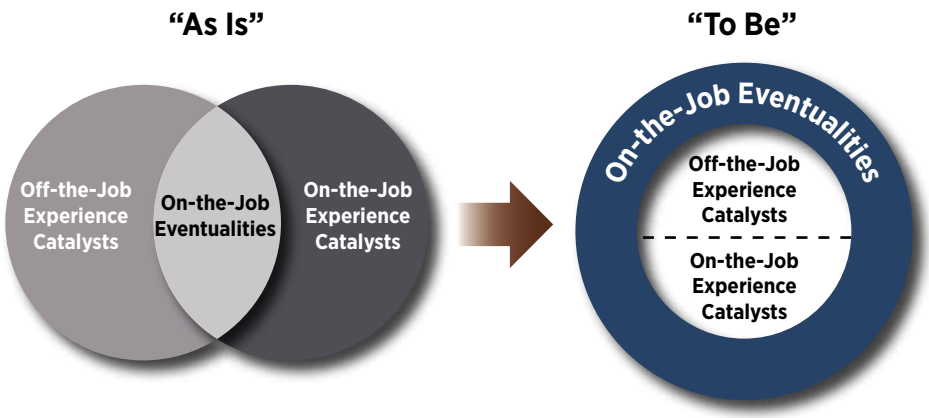
Recommendations

The data in this study confirmed the substantial influence of certain experience catalysts where they tend to predominate—in the workplace. Understanding the correlation and value of these high flyers can have a marked impact on individual performance and acquisition outcomes if fully exploited. The experience catalysts, operating in a less influential

state, could have a noticeable impact as well. If appropriately recognized (and in some cases either clarified or re-energized), they could serve as a powerful force multiplier for even more experience gains.

Members of the Defense Acquisition Workforce participating in this study reaffirmed the major experience gains achieved by work-related experience catalysts. Ideally, the sooner that formal training and informal training converge, the greater will be the impact of *off-the-job* training that better prepares the workforce for many more uncertainties in the workplace (Figure 5).

FIGURE 5. REDUCING THE GAP BETWEEN OFF-THE-JOB AND ON-THE-JOB CATALYSTS



Convincing organizations to embrace themselves as informal *learning organizations* where the preponderance of experience actually takes root (i.e., *on-the-job*) could serve as a crucible for many experience catalysts. Toward that end, the following recommendations are warranted for defense acquisition operating units:

Codify yourselves as *Learning Organizations*

Recognize the wide range of experience catalysts found in the workplace and how they can favorably impact organizational outcomes. Institute and monitor with regular frequency the effect of these experience catalysts inside the organization. Adjust as required. Reduce the barriers that might be limiting certain experience gains. More specifically:

- *Keep the work challenging and in perspective:* The Defense Acquisition Workforce expects to be challenged—a key part of their professional growth. Workers tend to stay at the job and remain focused when the work is challenging and relevant; they leave when the work is not.

- *Capitalize and promote knowledge sharing opportunities.* Build a flexible and enduring information architecture warehouse that contains actionable information that personnel can tap freely. Provide easy access to sources of expertise. It deepens their knowledge base, expands perspectives, and fuels their experience engine. Without open and continuous dialogue, competency gaps are more likely to occur, and experience growth might plateau and limit organizational gains. Promote *knowledge sharing* media like social networks. Personnel also need slack time and decision-making autonomy to benefit from access to new knowledge, regardless of the source (Haas, 2006). Reward personnel for integrating and applying new knowledge when it creates organizational performance gains.

- *Get supervisors involved in the training process before and after the event.* With greater involvement, training can have more relevance and create more favorable impacts back on the job. The most important environmental factors at work affecting training transfer include "discussions with the supervisor on the use of new learning, the supervisor's involvement or familiarity with the training, and positive feedback from the supervisor" (Nijman, Nijhof, Wognum, & Veldkamp, 2006). Supervisor commitment is crucial in validating the usefulness of training.

- *Clearly articulate and punctuate the effectiveness of organizational processes.* Keep processes current, effective, and relevant. Communicate their usefulness with regular frequency. Revise or terminate processes that have outlived their usefulness. Do not change what is working well for the sake of change.

- *Promote and support professional development opportunities.* Broaden employees' knowledge by giving them an opportunity to reap the experiences and effective practices of others. Encourage professional relationships and future experience networks that employees can leverage for years to come. Make an organization stronger by combating competency gaps, thereby helping to break down outdated mental models.

- *Promote mentorship.* Draw from the rich experiences of seasoned, introspective, and proven leaders. They can help build a sustainable career pathway for personnel who are looking to widen their experience gains as they pursue their professional careers.

- *Recognize the efficacy of DAWIA training.* Ensure employees are ready for the training and the training is meeting their needs. Provide useful and timely feedback to the training communities.

- *Recognize the value of on-the-job activities.* Explore *immersion days* and *offsites* to promote experience gains for personnel back *on the job,* and target individual and organizational performance.

The following recommendations are warranted for defense acquisition training organizations:

Continue to tighten the connection between *off-the-job training and on-the-job training*

Learners need to understand the connection by witnessing the connection. The clearer the link between the skills taught and the skills required at work, the more newly acquired skills will stick. Make it truly experiential. Validate the learning objectives taught in class with outcomes in the field through measurable follow-up initiatives later at work. Specialize the training by mimicking learners' work environments through methods that ignite the senses. View training courses as training workshops. "The road to exceptional performance is the result of deliberate practice" (Colvin, 2010).

- *Maximize SBL.* Few training techniques emulate actual work environments better. SBL tests the workforce under realistic conditions and gives them a chance to show their grit without the threat of dangerous consequences. It also brings together both cognitive (e.g., mental processes, knowledge application, etc.) and affective (e.g., feelings, attitude, etc.) behaviors, thereby increasing the quality of the experience. "Everything depends on the quality of the training experience" (Dewey, 1998).

- *Reinforce the benefits of certification standards.* While it should have bearing on upward mobility, it should not be the principal motivation. Many respondents viewed getting their certifications as a way to get promoted and sought training accordingly.

- *Monitor the usefulness of knowledge sharing media like CoPs and others, especially social media.* Either re-invigorate certain *CoPs* that have dropped sharply in popularity or replace them with more promising *knowledge sharing* methods. If seen as invaluable, personnel will use them. *CoPs* can provide the Defense Acquisition Workforce tremendous access to a wider experience network, but such experience has to go beyond simple data transmission. Research evidence shows that *knowledge sharing* methodologies involving personal interactions are superior to those involving only document exchanges alone. "Knowledge often needs to be carefully adapted to a new context in order for it to be effectively utilized" (Leonard-Barton, 1988).

A follow-on study that tracks specific behavioral changes associated with the experience catalysts discussed in this article would help describe the weighting and progression of these experience catalysts.

Conclusions

In today's budget-tightening environment amid increased public scrutiny of every dollar the DoD spends, the Defense Acquisition Workforce is facing growing pressure to make every dollar for its goods and services count. While experience has and will continue to be a fundamental component of the human capital development equation, it is

vitally important that the DoD recognize what experience catalysts matter the most to the Defense Acquisition Workforce. Twenty years from now, experience inside the Defense Acquisition Workforce will matter just as much as it did when Congress voted the DAWIA into law over 20 years ago. The only difference might be that the seam between off-the-job training and *on-the-job training* will disappear. When the Defense Acquisition Workforce is tested through intellectual workouts that mimic their on-the-job conditions, performance outcomes will likely rise. Exercises like Air Force Space Command's Guardian Challenge that now includes its acquisition arm are helping achieve that goal (Tremaine, 2010).

The Defense Acquisition Workforce would be well-served if it recognizes the importance of experience catalysts—even the ones operating in the lower bands. Granted, many variables are involved in the experience equation. However, to maximize the equation the workforce must:

- Continuously practice their craft at work in what has long been serving as on-the-job laboratories.
- Apply their intellectual mettle in the face of *challenging work* with supervisors and mentors close by.
- Consistently share relevant information through a highly collaborative environment in a wide range of media.
- Recognize the connection between training and certification.
- Continuously think beyond yesterday's beliefs without getting trapped by competency gaps that could prevent experimentation with more suitable and effective alternatives. Past experience can sometimes create blind spots and interfere with the need for innovation or modernization—something the Defense Acquisition Workforce or any other profession can ill afford. KSAs are so tightly connected to experience that they could become too grounded in yesterday's beliefs. In other words, the same attributes that once yielded conventional wisdom can sometimes produce fixed mindsets, superstitious learning (e.g., single perspectives, learning the wrong things, etc.), or competency traps and erroneous inferences (Levitt & March, 1988).

Before 1947, engineers believed the speed of sound represented a physical barrier for aircraft (and pilots) because the formation of a violent shock wave would induce catastrophic aerodynamic effects and cause complete flight control failure. Those beliefs changed when Chuck Yeager broke the sound barrier in the Bell X-1 *Glamorous Glennis* on October 14, 1947. Similarly, other technical beliefs had to change well before Neil Armstrong could walk on the moon on July 20, 1969.

Implementing these actions would fully energize the confederation of experience catalysts and noticeably influence performance gains.

As Oscar Wilde said over a hundred years ago, "Experience is the name every one gives to their mistakes" (Wilde, 1892). Consequently, the Defense Acquisition Workforce needs the time to practice and learn from their mistakes just like any other profession, and can ill afford any experience shortfall that results in weapon systems delays for warfighters serving in harm's way. Warfighters depend on the Defense Acquisition Workforce to get it right the first time—and that's the only "Aha!" that really matters.

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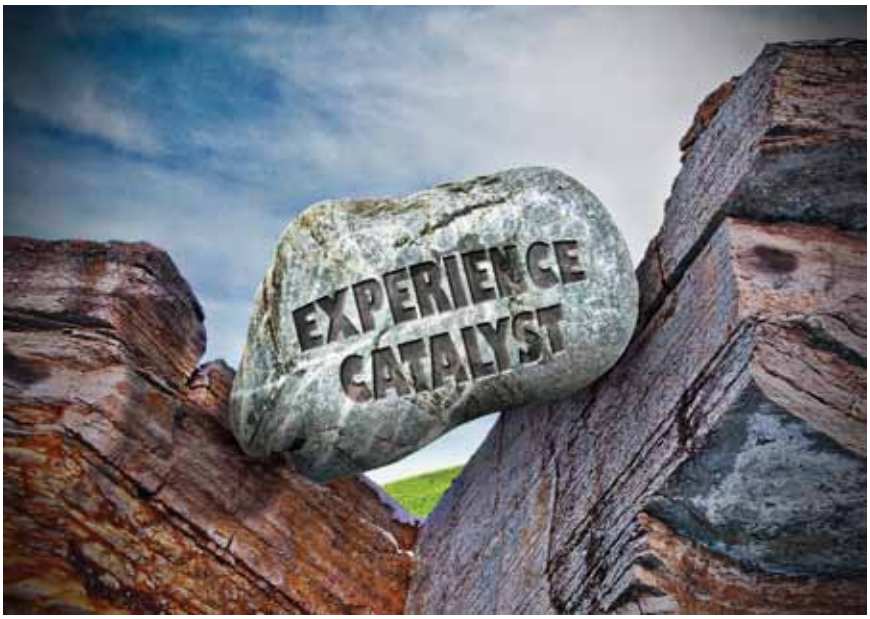


Keywords: *Space Acquisition, Space Industrial Base, Export Licensing, System Dynamics Modeling, International Traffic and Arms Regulations (ITAR)*

U.S. Space Acquisition:

Challenges in the Final Frontier

Barry "Jay" Borst, Shahram Sarkani, and Thomas Mazzuchi

Space contributes to the security and economic stability of the United States. However, numerous studies, articles, and surveys state export control is hurting the space industrial base. The nation's ability to acquire space systems, according to many published sources, is diminishing and may impact its leadership in the field of space. Many claim excessive export controls as one of the primary causes and often cite statistics, data, and information contained within a 2007 Air Force Research Laboratory (AFRL) survey to validate their claim. While the AFRL survey certainly provides insight and should not be entirely discounted, the application of System Dynamics Modeling suggests the survey's findings on export control are outdated.

image designed by Diane Fleischer »

> "In this new century, those who effectively utilize space will enjoy added prosperity and security and will hold a substantial advantage over those who do not.... In order to increase knowledge, discovery, economic prosperity, and to enhance the national security, the United States must have robust, effective, and efficient space capability."
>
> —Executive Office of the President, 2006

The Cold War amplified space as a national interest and helped secure the nation's position as a world leader in the field. Evolving space capabilities through and beyond the Cold War have enabled the United States to increase the sophistication of its technology and significantly improve the quality of life for its citizens. The development of space capabilities has allowed the nation to explore the moon, probe planets, and send spacecraft beyond our solar system and into the Milky Way Galaxy. Additionally, space systems have substantially contributed to our understanding of our own planet as well. The proliferation of space systems and space technology has acted as a catalyst in developing new markets and creating new economic opportunities. It has furthered medical research such as advances in studying the effects of bone loss and even resulted in the development of drugs to treat various forms of cancer. It has also changed the way in which we communicate and the manner in which we enjoy entertainment media and services such as satellite Internet, television, and radio.

Space has also significantly contributed to our national security. Space-based assets provide information for our military forces in denied areas. Such assets enable the monitoring of political and military developments of our adversaries and reduce the risk of surprise. Space systems have also changed the means by which we conduct war. From the early moments of the first Persian Gulf War, satellites demonstrated they were a force multiplier on the strategic, operational, and tactical level. For the first time, satellites connected geographically separated military forces with national-level decision makers in near real time, and enabled the collection of data on operationally relevant conditions in surveying and targeting hostile forces (Hamel, 2006). Not surprisingly, our military forces continue to rely upon space-based assets for

operations throughout the world. In short, "our national security and public safety, global economic competitiveness, and scientific capabilities are all reliant on access to space and space-based capabilities" (Pace, 2009).

However, a number of issues are challenging our ability to acquire space systems, which may adversely impact our national security. Among those issues is concern for the space industrial base. In short, various surveys, articles, government reporting, and white papers suggest the health of the nation's space industrial base may be in decline. In particular, the Air Force Research Laboratory (AFRL) survey of the industrial base revealed relatively flat profits, smaller research and development programs, a shortage of skilled workers, and shrinking defense budgets as evidence of an unhealthy space industrial base (Department of the Air Force, 2007).

Discounting national security, there appears to be almost unanimous agreement across the field of experts that U.S. export control regulations are hurting the industry economically. Aside from being overly complex, experts are expressing particular concern with wait times for export licenses, and attributing long processing times to a loss of sales in the international market. In fact, according to the Satellite Industry Association (SIA), estimates reflect that from 1999–2005, the

U.S. satellite industry lost anywhere between $2.5 billion to $6 billion in revenue (Krause, 2008). Given a weak business case and marginal revenue, many space firms are leaving the industry for more lucrative markets. Should the trend of firms leaving the market continue, the Department of Defense (DoD) could find itself relying upon foreign providers for the specialized parts needed in the development of its space programs.

Noting the focus on the space industrial base and the export control process, the authors of this article seek to accomplish four objectives.

- First, briefly review the state of the space industrial base as described by the AFRL survey.
- Second, provide a brief overview of the current export control process.
- Third, using the System Dynamics Model, review the current export control license process and evaluate its results against those of the AFRL survey. Further, determine whether the views of the AFRL survey on licensing still apply in today's world of exports.
- Fourth, provide a set of recommendations aside from export control reform that may increase the competitiveness of the industry.

State of the Space Industrial Base

A survey of the space industrial base was conducted in 2007 by the Department of Commerce Bureau of Industry Security (BIS), AFRL, the National Security Space Office, and the Federal Aviation Administration Office of Commercial Space Transportation. A more current survey is in progress, and its results are expected in the 2012–2013 timeframe. The AFRL survey was implemented in three phases and was designed to evaluate the impact of export control regulations on the health of the industry. The survey was administered to 274 space firms with 74 percent or 202 firms actually responding to the survey (Department of the Air Force, 2007). Although the survey was much more encompassing, for our purposes we will examine its observations on licensing processing times and its effects on sales and market share.

Export License Processing

The survey collected data associated with export licensing between the years 2002–2006 and explored two themes. The first included reviewing the number of licenses applied for and categorizing them into approved and disapproved. The second theme involved the actual time it took to apply for a license and receive notice on its determination.

According to the survey, the number of export license applications received has consistently increased from 2002–2006. On average, space industrial firms submitted over 1,100 applications a year during this time period, and less than 1 percent of those were rejected (Department of the Air Force, 2007). Although less than 1 percent of all applications were rejected, the general trend in processing time between the years 2002–2006 increased. Average processing time in 2002 was just 52 days, and by 2006 had more than doubled to 106 days (Department of the Air Force, 2007). This would effectively prohibit a firm from competing in international bids as it would most likely fail to respond within established timelines. Since then, the Department of Commerce and the Department of State have implemented an electronic application system as well as increased staffing and training, resulting in significantly decreased license processing times.

Sales and Market Share

The survey calculated that the U.S. space industry lost over $2.35 billion between the years 2003–2006 (Department of the Air Force, 2007) In terms of percentages, 2003 was the hardest year, where the industry lost 45.2 percent of its overseas sales (Department of the Air Force, 2007). Between 2004 and 2006, the percentage of U.S. shares in the international market steadily declined. Within satellite manufacturing alone, U.S. firms held 63 percent of the satellite manufacturing market in 1998, whereas in 2006 they only possessed 42 percent of the market (Department of the Air Force, 2007). Correspondingly, revenues for satellite manufacturing dropped from $6.6 billion in 1998 to $4.2 billion in 2006 (Department of the Air Force, 2007). Further, many firms reported they believed export control presented an opportunity for foreign competitors to capture a greater share of the market. In fact, Europe increased its market share of launch services from 9 percent in 1998 to 23 percent in 2006 (Department of the Air Force, 2007). Consequently, approximately 25 percent of firms responding to the survey indicated they would now focus their efforts on the domestic market (Department of the Air Force, 2007).

Further, declining sales during this time period corresponded with a decline in revenue as a significant portion of firms reported profit margins of only 4 to 6 percent (Department of the Air Force, 2007). These low profit margins mean less revenue for firms to invest in their personnel, and in their research and development. Combined with pressures from prime contractors to provide the "best possible price," these firms then become less competitive—thus, we see a "hollowing out of the supply chain" (DeFrank, 2006). Additionally, the Suppliers Excellence Alliance asserts that 50 percent of all second- and third-tier suppliers will cease to exist within the next few years (DeFrank, 2006). This represents a serious problem as the primary contractors (Lockheed Martin, Boeing, Northrop Grumman, etc.) subcontract out approximately 80 percent of their space acquisitions to these lower tiered firms (DeFrank, 2006).

However, in light of new and more current data, this survey's view on the industry may no longer portray a true picture. (This will be addressed later in the article.) Nonetheless, this survey, along with numerous other studies, white papers, and articles, served to focus the spotlight on export control reform for the federal government—specifically, the drive for a single export control list, a single export licensing agency, a single information technology system, and a single export enforcement agency. In the next section, we examine export control regulations in more detail.

Export Control Regulations

The purpose of export control is to prevent sensitive technologies from falling into the hands of adversaries who stand to gain an advantage. Although created from a number of congressional acts dating back as early as the 20th century, the *Arms Export Control Act (AECA) of 1976* and the *Export Administration Act of 1979* are perhaps the most significant. This legislation empowers the President of the United States with responsibility for the control of imports and exports of defense-related items, services, and articles, etc. (AECA, 1976). Additionally, it also authorizes the President to issue policy guidance to those entities involved in the import and export of defense items.

Today, the Department of Commerce and the Department of State are primarily responsible for implementing export control. The Department of Commerce administers the Commercial Control List (CCL) and primarily examines items for export that have a "dual-use" application. The Department of State administers the International Traffic and Arms

Regulations (ITAR) through the United States Munitions List (USML) under the auspices of the Arms Export Control Act of 1976. Through the USML, the Department of State primarily seeks to prevent sensitive technology, services, articles, and information from falling into the hands of a possible adversary.

However, a number of other agencies and organizations play smaller or secondary roles. Some of these include the DoD, which administers for the Department of State its Foreign Military Sales through DoD's Defense Security Cooperation Agency; the Department of Energy, which monitors exports for compliance with nuclear nonproliferation; and the Department of Treasury in ensuring trade does not occur with embargoed nations. Still other agencies include the U.S. Customs Agency, the Office of Foreign Asset Control, the U.S. Census Bureau as well as the Office of Management and Budget. The list of players continues to expand when it comes to enforcement of export control, i.e., conducting investigations and prosecutions when violations occur. These include the Department of Homeland Security through the Customs and Border Protection as well as the Department of Justice through the Federal Bureau of Investigation.

The result is a myriad of organizations with overlapping responsibilities, employing various means and methods for tracking and reporting, administering differing levels of training, and even using different export control lists. Nonetheless, U.S. space firms are expected to navigate through this maze of bureaucracy and comply with regulations. Failure to do so is severe, often resulting in significant financial penalties and jail time. Indeed, barring a firm from participating in exports is the probable outcome for any firm failing to comply with regulations. For example, in one case an individual was charged two fines of $250,000 and was sentenced to 5 years in prison for exporting without a license (Cheadle, 2005).

ITAR

Managed by the Department of State under the Office of the Directorate of Defense Trade Controls (DDTC), ITAR uses the USML to determine if an article or service is deemed defense-related through the following criteria (Department of State, 2011a):

- An item that is specifically designed, developed, or modified to meet a military purpose.
- An item that largely does not have a civil application or role.
- An item that does not have a civil equivalent in terms of performance.
- An item that has significant military or intelligence applicability.

ITAR defines an article or service as "any item or technical data ... recorded or stored in any physical form, model, mockups, or other items that reveal technical data ... it does not include basic marketing information on function or purpose or general system descriptions" (Department of State, 2011a). It further defines major defense equipment as "any item of significant military equipment on the U.S. Munitions List having a nonrecurring research and development cost of more than $50,000,000 or a total production cost of more than $200,000,000" (Department of State, 2011a). Unfortunately for the U.S. space industrial base, a satellite has been classified as a munition in its entirety, including literally the nuts and bolts that are used to hold it together. This is a result of the Strom Thurmond National Defense Authorization Act of 1999, which states, "Due to the military sensitivity of the technologies involved, it is in the national security interests of the United States that United States' satellites and related items be subject to the same export controls that apply under United States law and practices to munitions" (National Defense Authorization Act, 1999). Space systems and related items can be found in category IV: Launch Vehicles, Guided Missiles, Ballistic Missiles, Rockets, Torpedoes, Bombs, and Mines as well as category XV: Spacecraft Systems and Associated Equipment (Department of State, 2011a).

A firm can request clarification if its item falls under ITAR or challenge the presence of an item on the USML by implementing a Commodity Jurisdiction Request. Under this procedure, an entity may submit

a letter to the Department of State as well as materials for examination to determine under which jurisdiction an item falls. Upon receipt of the request, the Department of State will examine the materials using a cross-functional set of agencies to determine jurisdiction (Cheadle, 2005). Although firms may continue to conduct business, they must treat these items as under the USML until a final determination is made.

Export Administration Regulations

The Export Administration Regulations (EAR) are overseen by the Department of Commerce and derive their authority from the Export Administration Act of 1979. EAR pays close attention to those items labeled as dual use. This term is used to identify an article that may have both a military/strategic application as well as a commercial application. Its use also distinguishes an item that has purely a military/strategic application from a dual-use item. Nonetheless, EAR also covers some items that have solely civil uses.

Under the EAR, the Department of Commerce defines an export as an item leaving the United States for a foreign destination. An item can be physical in nature such as clothing, electronics, mechanical equipment, etc., but it can also be virtual in nature such as an e-mail with schematics for a vehicle. Regardless, it doesn't matter how the item arrives at a foreign destination; as long as it leaves the United States for a foreign destination, it is considered an export.

The Department of Commerce, through the BIS, monitors and controls the export of commercial items. According to the BIS, very few commercial items need an export license. However, exporters are responsible for determining if they need an export license for their item. Most item designations can be found by referencing the CCL through an Export Control Classification Number. The CCL is organized around 10 broad categories that are further defined by five product groups. For our purposes, we are expressly interested in Category 9: "Propulsion Systems, Space Vehicles, and Related Equipment" (Department of Commerce, 2007b; 2008; 2009; 2010).

The Export Control Model

The Export Control Model was built using System Dynamics Modeling software that allows the user to "link" relationships between objects. Once relationships are defined, a series of rates and flows are established enabling the user to examine the behavior of the system. In our particular case, we are interested in the number of export license applications that are received, how fast they are processed, and how many are approved.

This particular model is comprised of two modules representing the Department of Commerce and the Department of State. Each module is further defined by two submodules. The Department of Commerce model contains a Submitted Export License Applications submodule, but unlike the State Department's Commodity Jurisdiction Request submodule, the Department of Commerce model contains a Commodity Classification Requests submodule (Figure 1). The Department of State module is comprised of a Commodity Jurisdiction Requests submodule and a Submitted Export License Applications submodule.

FIGURE 1. EXPORT MODEL MODULE OVERVIEW

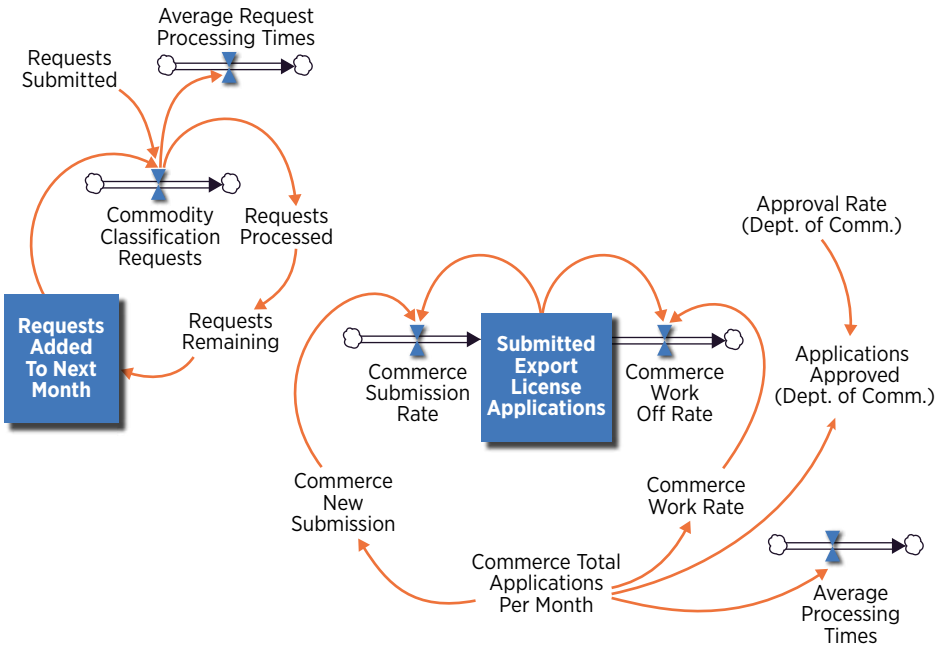
Department of Commerce	
Commodity Classification Requests	Submitted Export License Applications

Department of State	
Commodity Jurisdiction Requests	Submitted Export License Applications

Department of Commerce Model

As previously mentioned, the Department of Commerce Model is comprised of two submodules (Figure 2). Data for this model were collected from BIS Annual Reports between 2007 and 2010. The model works on a monthly cycle and carries out to 100 months. Thus, the model runs projections roughly over 8 years and allows us to view any anomalies with perspective should they occur.

FIGURE 2. DEPARTMENT OF COMMERCE MODEL



Commodity Classification Requests submodule. Commodity Classification Requests are submitted anytime a potential exporter is unsure of how to classify an item identified for export; the "Request Submitted" input represents this function. A random uniform function embedded in the "Commodity Classification Request" input generates a number of requests each month, which are received by BIS based upon data found in the BIS annual reports. The lowest number of requests submitted by year was 5,878, whereas the highest number of requests submitted by year was 7,360 (Department of Commerce, 2007a; 2008; 2009; 2010). The yearly totals are divided by 12 (490 and 613 respectively) as the model runs on a monthly cycle. The results are fed into the "Average Request Processing Times" calculator to determine the average time required to process a request. Results are then fed into"Requests Processed" to run the simulation for aerospace requests only. Taken together, we see the model produced on average 24 to 30 applications a month that were processed within 33 to 42 days. Those requests not completed within the month are stored in "Requests Remaining" and are then fed into "Requests Added to Next Month."

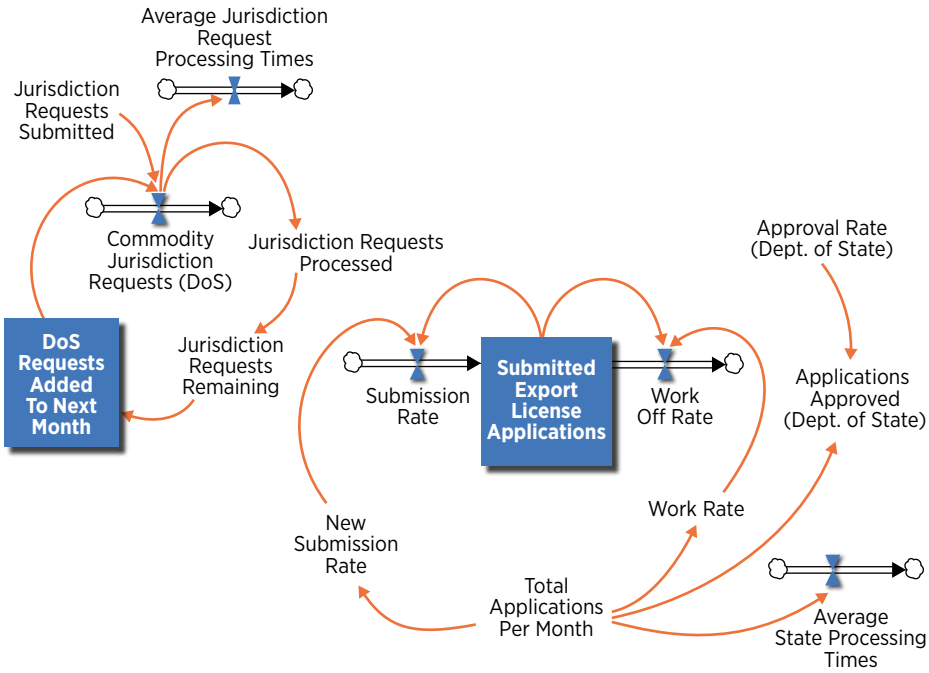
Submitted Export License Applications submodule. Data for the Submitted Export License Applications submodule were again collected from BIS annual reports between the years 2006 through 2010. Data were provided over the entire year and represent all exports that fall under the CCL, not just Category 9: Aerospace and Propulsion. However, Appendix E of the Bureau of Industrial Security Annual Report: Approved Applications for Country Group D, provides a breakout of the number of licenses by category type. The model begins with "Commerce Total Applications Per Month," which is embedded with a random number generator to simulate the total number of export license submissions. This number is then circulated through submission flows and work-rate flows to simulate the actual number of aerospace applications arriving and how fast they are worked off. It also feeds the "Average Processing Times" and "Approval Rate" to simulate typical processing times and approvals of submitted license applications. Thus, reviewing years 2006 through 2010 revealed that the average number of Aerospace and Propulsion licenses hovered around 5 percent. The model simulates this data by dividing the yearly data by 12 and then multiplying that result by 5 percent. On average, the lowest amount of applications submitted was 1,537 per month, and the highest amount was 1,754 applications per month (Department of Commerce, 2006; 2007a; 2008; 2009; 2010). Running the simulation with factoring just for the Aerospace and Propulsion category, the model produces about 77 to 88 export licenses per month.

According to BIS, approximately 84 percent of all applications are approved, and approximately 15 percent are returned without action (Department of Commerce, 2006; 2007a; 2008; 2009; 2010). Applications returned without action are usually the result of incomplete applications, missing information, and/or conflicting data. Thus, only about 1 percent of all applications are rejected. Additionally, the model simulates processing times described in the BIS Annual Report as averaging between 26 and 29 days.

Department of State Model

The Department of State baseline model (Figure 3) also contains two submodules—a Commodity Jurisdiction Requests submodule and a License Applications submodule. Data for the License Applications submodule were obtained from various sources including BIS Annual Reports and Department of State Section 655 Reports between the years

FIGURE 3. DEPARTMENT OF STATE (DoS) BASELINE MODEL



2006 and 2010 as well as metrics reported on the Department of State website. Like the Department of Commerce model, this model also simulates 100 months of activity.

Commodity Jurisdiction Requests submodule. The Commodity Jurisdiction Requests submodule works in the same manner as the Commodity Classification Requests submodule and attempts to simulate the number of jurisdiction requests the DDTC would typically receive on a monthly basis and, on average, how long it takes to process those requests. The purpose of this submodule is to determine if there are excessive delays preventing a firm from responding to a Request for Proposal in a timely manner. A jurisdiction request may be filed for a couple of reasons. First, a firm or individual may file a jurisdiction request to determine which list—the CCL or the USML—their particular item may fall under. A firm or individual may also file a jurisdiction request if they believe their item does not fall under export control.

Although the process involves multiple organizations, the Department of State is ultimately responsible for administering Commodity Jurisdiction Requests. Data for the number of jurisdiction requests as well as the average time to process those requests were provided from the Bureau of Political-Military Affairs, DDTC. These requests are then divided by 12 to fit the monthly timeframe of the model. Running the model, on average it appears DDTC receives about eight to 39 requests a month for space systems. Additionally, the model simulates an average processing time of just over a month.

Submitted Export License Applications submodule. The Submitted Export License Applications submodule works in the same manner as the Department of Commerce Submitted Export License Applications submodule. According to metrics provided by the Department of State website, the DDTC receives approximately 6,100–8,400 applications per month for licenses covering all ITAR categories (Department of State, 2011b). The model is adjusted to 5.2 percent factoring in the Department of State's breakout of export control licenses (Department of State, 2006; 2007; 2008; 2009; 2010). This equates roughly to about 322 to 431 space export licenses a month. Approximately 84 percent of those applications are approved, 15 percent are returned without action, and less than 1 percent are denied. The average processing time within the model for those applications hovers around 14 to 19 days. This corresponds closely to data reported by the Department of State, where processing time averages around 14 to 20 days (Department of State, 2011b).

Observations

Data produced from the model seem to dispel the AFRL survey's finding that export control licensing is preventing the industry from successfully competing in the international market. The majority of export licenses currently handled by the Department of State are processed within 14 to 19 days vice the 52 and 106 days reported by the AFRL survey. Further, not only did the Department of State dramatically reduce the amount of time to process an application, but did so while handling a 20 percent annual increase in the number of license applications submitted (Government Accountability Office, 2010). The Department of Commerce also reveals reasonable results as it handles 77–88 applications a month and approves roughly 70 of them. A summary of the model's results can be found in the Table. The remarkable improvement in processing times can be attributed to the use of electronic systems to handle

requests, increased staff, and training. The reduced processing times coupled with the increased volume of export licenses also corresponds with a steady increase in sales. In 2007, the industry saw approximately $36 billion in sales and grew continually, whereas in 2010 the industry saw $41 billion in sales (U.S. Census Bureau, 2011).

TABLE 1. SUMMARY MODEL RESULTS

Department of Commerce	Result	Department of State	Result
Commodity Classification Requests	24–30	Commodity Jurisdiction Requests	8–39
Classification Request Processing Time	33–42 days	Jurisdiction Request Processing Time	36–40 days
License Applications	77–88	License Applications	322–431
License Processing Time	26–32 days	License Processing Time	14–19 days
Licenses Approved	65–74	Licenses Approved	270–362

Additional factors coupled with more current data also seem to throw the AFRL survey results into question. For instance, an unsteady demand in the acquisition of satellites is prevalent across the entire international market, not just the United States. Specifically, in 2002 international satellite manufacturing reported $11 billion in sales, dropped to $7.8 billion in 2005, rose to $12 billion in 2006, and then dropped again to $10 billion in 2010 (Satellite Industry Association, 2011). This could help explain why the AFRL survey saw significant losses in satellite manufacturing. Another factor to consider is the implementation of protectionist strategies. Nations enacting these policies often subsidized their space industries and promoted internal purchase preferences. In fact, for those firms surveyed, protectionism was the leading write-in factor as a barrier to entry into the international market. "The number one write-in factor reflecting how U.S. firms view the current international competitive environment was 'buy European/protectionism' ... U.S. firms

are being excluded from foreign markets ... for noncompetitive reasons" (Department of the Air Force, 2007). A shift also appears to be occurring in the industry that could also account for declining spacecraft sales. For example, satellite services sales accounted for 50 percent of sales in 2002, then rose steadily every year since, and in 2010 represented 60 percent of all sales (Satellite Industry Association, 2011).

The AFRL survey asserts that export control regulations are hurting the industry. During the 2006–2010 time period, export control most likely had an impact on the industry—although a myriad of other activities and events were also impacting the industry as well, not just export control. If export controls were lifted in their entirety, the United States would undoubtedly see a boon in the space industry for a period of time. Admittedly, from an economic perspective, export control regulations do inhibit the industry to a degree. However, that inhibition is in exchange for maintaining national security. Regardless, it does not prevent the industry from being successful; in fact, the industry is showing signs of succeeding. Thus, the observations and statements of the AFRL survey on the state of industry are now questionable.

Recommendations

Undoubtedly, the proposal offered by the Obama Administration will bring some added benefit. Efficiencies are naturally expected to be gained from reforms such as a single information technology system and a single enforcement agency. Albeit these reforms will take years and Congressional action to enact, and they appear more likely to benefit the departments and agencies involved in export control rather than help the industrial base compete in the international market. Aside from export control, there are some areas where the U.S. Government could help the industrial base in the domestic market. Two such measures could include implementing a more distributed space architecture and addressing the anticipated space systems acquisition workforce skill shortage.

Currently, the federal government is by far the largest consumer of products and services offered by the U.S. space industry. Unfortunately, the government insists on buying large, complicated space systems commonly referred to as Battlestar Galacticas. The problem with these systems is that they are one-of-a-kind, which doesn't allow the industry to mass-produce parts that have the potential to continually generate income. Specifically, the AFRL survey stated the inability to mass-produce spacecraft components was one reason why many firms were leaving the space market (Department of the Air Force, 2007). Thus, once they build one space system, they have to retool and re-engineer their manufacturing processes to build the next. However, the government could purchase smaller, less complicated satellites on a larger scale. The United States could employ a system of satellites that work together to perform a function or set of functions. Not only would this provide opportunities for modular engineering, plug-and-play parts, and mass production, but it would also enhance the resiliency of the nation's space architecture.

For example if one system fails, functionality is not lost because of built-in redundancy. Additionally, firms are better prepared to weather the effects of hostile operations against their systems. In short, producing greater numbers of smaller satellites that are modular in design may provide enough of a business case for those firms to remain in the market.

As for the space systems acquisition workforce, many U.S. firms do retain a reasonably stable workforce. However, many respondents on the AFRL survey stated that a skill shortage exists in the workforce. Addi-

tionally, a significant portion of the space systems acquisition workforce is nearing retirement, and this potentially represents a significant loss of knowledge and experience. The U.S. Government and industry could offer incentives such as generous scholarships or grants to those students who enroll in engineering and program management programs with a space systems acquisition concentration. This would attract and produce new entry workers with skills the industry needs. Strong mentoring and training programs for the middle- and entry-level positions can help stave off some of the effects of massive retirement.

Summary

Space is an economic and national security advantage for the United States. It plays a role in our banking and financial industries, it provides entertainment and enables us to communicate globally, it obtains information on otherwise denied areas, and it acts as a force multiplier in the conduct of military operations. In short, our leadership in space ensures our national security and our standing as a world leader.

However, space systems acquisition is inherently complex, and our inability to acquire such systems may jeopardize our leadership in the field of space. In particular, the health of the space industrial base presents a serious challenge to our acquisition of these systems. Studies and surveys point to relatively flat profits, and some have made projections that the space industrial base will shrink by 50 percent in the next few years (DeFrank, 2006). Should this trend continue, the DoD could find itself relying upon foreign providers for the parts and components it needs to build space systems.

The industry points to export control regulations as a primary cause and often cites the AFRL survey as validation of their concern. The industry believes regulations for obtaining an export license are complex and overly cumbersome. As a result, they believe they are unable to compete effectively in the international market, and thus focus their efforts on the domestic market. However, the federal government is the largest consumer of space services and manufacturing and buys "one-of-a-kind" systems—and does so sporadically.

Using System Dynamics Modeling, this article examined the AFRL survey's claim that the export control process is preventing the U.S. space industrial base from successfully competing in the international

market. Perhaps this was the case between 2002 and 2006. However, examining the modeling data from 2007 to 2010 reveals drastically shorter processing times along with a significant increase in the amount of license applications received. Further, when examining space sales from 2007 to 2010, we see a continual increase. Market shares may have decreased, particularly in satellite manufacturing, but that could also represent a shift in industry to a slightly more lucrative market such as satellite services. Further still, a decline in market shares could also be explained by subsidized firms and protectionist strategies that tilt the field in favor of competitors.

Nonetheless, continuing to rely upon the data within the AFRL survey to claim that export licensing is preventing the U.S. space industrial base from competing successfully in the international market no longer appears warranted. Export control may inhibit industry for the sake of national security, but it certainly does not prevent it from succeeding.

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Keywords: *Acquisition Reform, Culture, Leadership, Change, Government Acquisition Process*

The More Things Change, Acquisition Reform Remains the Same

Col Peter K. Eide, USAF, and COL Charles D. Allen, USA (Ret.)

For over 60 years, the Department of Defense has attempted to fix its weapon systems procurement without success. While notable exceptions emerged during the Global War on Terrorism (i.e., rapid development/fielding of Mine Resistant Ambush Protected vehicles and Improvised Explosive Device defeat systems), "Acquisition Reform" efforts have not consistently yielded a process/system that delivers products faster, better, or cheaper. In 2009, President Obama took the initiative to give reforms another try. Through an analysis that applies John P. Kotter's model of organizational change and Edgar H. Schein's approach to organizational culture and leadership, the conclusion suggests that current initiatives will not be successful. Behavioral change is needed to embed transformation. Acquisition reforms can be coerced, but will not endure as true transformation unless cultural change occurs.

image designed by Diane Fleischer »

Acquisition
Reform

In March of 2009, shortly after Barack Obama was sworn in as President, the Government Accountability Office (GAO) released its annual report "Defense Acquisitions: Assessments of Selected Weapons Programs" (GAO, 2009). Cumulative cost growth among assessed Department of Defense (DoD) programs had reached $296 billion. That latest revelation of inefficiency provided a rallying point for senior leaders in the White House, Congress, and DoD.

The GAO report was released as significant forces for change were beginning to move in the same direction. President Obama declared his commitment to reduce the federal deficit by half in 4 years as Congress made final changes on legislation aimed at acquisition reform (Phillips, 2009). Concurrently, Secretary of Defense Robert Gates espoused his own imperatives for acquisition reform (Gates, 2009), and hired a similarly motivated Under Secretary of Defense for Acquisition, Technology & Logistics (USD[AT&L]), Dr. Ashton Carter (Hearing, 2009). Together, these leaders emerged as a powerful coalition of change agents to fix the government's acquisition process.

But, will it all work? In *Leading Change*, John P. Kotter (1996) posited primary reasons why transformations fail. Closely related, Schein's (1992) seminal work on organizational culture emphasized the need for behavioral change to drive transformation. Both approaches are presented as a framework for assessing the likelihood of success for current acquisition reform. The prognosis for effective reform is dim without embedding leadership actions and institutional processes that will drive change in the culture of defense acquisition. Without such intentionality, one can expect to repeat the history of unfulfilled mandates for reform.

A Brief History of Acquisition Reform

The need to fix, or reform, the DoD's various acquisition processes is almost universally acknowledged. Numerous studies have informed U.S. strategic leaders on its shortcomings since 1949 (Assessment Panel, 2006). The following summary of acquisition reform initiatives since the 1980s provides context for an analysis of initiatives undertaken since 2009.

The Scandalous 1980s

The first half of the decade of the eighties, marked by "fraud, waste, and abuse" scandals in the procurement system, led to calls for reform (Parlier, 1989). In response, President Reagan created a Blue Ribbon Commission on Defense Management, also known as the Packard Commission, which produced what came to be known as the "Packard Report." Congress also worked its own legislative reforms to include the Goldwater-Nichols Department of Defense Reorganization Act of 1986. The Blue Ribbon Commission final report stated flatly, "Excellence in defense management will not and cannot emerge by legislation or directive" (President's Blue Ribbon Commission, 1986, p. xii). The commission believed that acquisition employees at all levels must be encouraged and empowered to succeed, and that Congress, DoD, and industry must all set aside parochialism and "restore a sense of shared purpose and mutual confidence" (p. xii). The Packard Report recommended specific ways in which Congress and DoD could improve program stability to mirror successful industry practices. Some of the specific commission recommendations became codified into law.

The Goldwater-Nichols Act of 1986 contained a major restructuring of DoD, to include changes that partially addressed the Blue Ribbon Commission's findings of diluted authority for execution. Accordingly, the 99th Congress, with the National Defense Authorization Act for Fiscal Year 1987, directed consolidation of the acquisition function within the offices of the Service secretaries. Other legislation that year included clarification of roles and responsibilities of the newly created position of the Under Secretary of Defense for Acquisition.

A More Business-Minded 1990s

The nineties saw further application of reform initiatives originally recommended by the Packard Commission. The Defense Acquisition Workforce Improvement Act (DAWIA) of 1990 addressed the need to improve the quality of the acquisition workforce, establishing formal career paths and standards for education and training. Following his inauguration in 1993, President Clinton also signed two reforms into law. The Federal Acquisition Streamlining Act of 1994 exempted procurement of commercial items from existing laws and expanded the definition of "commercial product" to broaden its applicability. The Clinger-Cohen Act of 1996 eliminated cost accounting standards that had discouraged commercial companies from doing business with the

federal government. Both reforms addressed the Blue Ribbon Commission's findings that a reduction in government red tape and commercial innovation was key to improved acquisition outcomes.

William Perry, a commission member, became Secretary of Defense in 1994 and initiated the most severe reforms with the famous "Perry Memo" (1994). Perry directed the armed services to use commercial specifications and standards when contracting for goods and services instead of the index of military specifications and standards then in existence. Perry also mandated Integrated Product and Process Development (IPPD) and Integrated Product Teams (IPTs) to manage program execution. Cost as an independent variable (CAIV) would be used to contain cost growth. Advanced Concept Technology Demonstrations would also employ prototypes to reduce risk and maximize operational utility of new weapon systems (Carter & White, 2000).

In 1997, Secretary of Defense William Cohen undertook a series of additional acquisition reforms under the umbrella of "Defense Reform Initiative (DRI)." His DRI Report identified four areas, or pillars, of reform: Reengineer – adopt modern business practices; Consolidate – streamline organizations to eliminate redundancy and maximize synergy; Compete – apply market mechanisms to improve quality and reduce costs; and Eliminate – reduce excess support structures to free resources and focus on core competencies (Cohen, 1997). DRI was largely a continuation of themes introduced by the Blue Ribbon Commission.

New Century, Old Problems—2000-2005

With the turn of the century, the Revolution in Military Affairs also called for a concurrent Revolution in Business Affairs. With the experience gained since his 1997 appointment, Under Secretary of Defense for Acquisition, Technology, and Logistics (USD[AT&L]) Jacques Gansler put forth a new path for the new century through acquisition reform in response to studies directed by Congress. He noted three clear "top line" goals: reduce cycle times for the development and delivery of new weapon systems; reduce total ownership costs; and right-size the Defense Acquisition Workforce and infrastructure to realize savings through efficiencies, and maximize flexibility in the new business environment (Gansler, 2000). Efforts included increasing reliance on an integrated civil-military industrial base, focus on cost and schedule as priority parameters over performance, and necessary training of the Defense Acquisition Workforce on commercial practices.

With his second appointment as Secretary of Defense, Donald H. Rumsfeld brought his own business-minded approach to transformation. For Secretary Rumsfeld, buying the right thing was as important as buying it right, and transformational, network-centric capabilities were more important to future conflict than legacy systems (Adler, 2007). Following a business-like approach, Rumsfeld sought innovation capabilities from nontraditional defense industries.

Are We There Yet?—2005 to Present

Despite the extensive reform efforts, by 2005 DoD and Congressional leadership as well as President George W. Bush lost confidence in the acquisition system (Assessment Panel, 2006). On June 7, 2005, Acting Deputy Secretary of Defense Gordon England established the Defense Acquisition Performance Assessment (DAPA) Project to conduct a sweeping and integrated assessment of "every aspect" of acquisition. DAPA's major findings included recognition that the industrial base had consolidated significantly since the mid-eighties and that the nature of the post-Cold War security environment placed a premium on flexibility and technological exploitation. DAPA, like previous efforts, identified excessive oversight and complex acquisition processes as cost and schedule drivers, and called for stability of requirements as an essential element for an effective acquisition system.

The history of acquisition reform reflects much has been done to study the problem, identify candidate solutions, and execute reforms, only to return to the conclusion that more reform is needed. The most recent acquisition reform initiatives of the Obama Administration and the 111th Congress followed suit.

Acquisition Reform in 80 Days

Secretary of Defense Robert Gates (2009) offered his own convictions regarding the need for acquisition reform. "We must reform how and what we buy," he said in his fiscal year 2010 budget recommendation, "meaning a fundamental overhaul of our approach to procurement acquisition and contracting." Like President Obama, Gates pulled no punches in his characterization of the breadth and depth needed for acquisition reform. He asserted that dramatic change would be required in order to maintain U.S. military superiority in an environment of shrinking economic resources.

Secretary Gates identified three fundamental steps to accomplish needed reform. First, senior leaders must demonstrate commitment and courage to discontinue programs that are either failing or procuring more capability than was needed. Second, performance requirements should be scrutinized and, as necessary, limited to avoid cost and schedule overruns while procuring what is technically feasible. Finally, government program teams should be adequately staffed for proper oversight, cost estimates should be more realistic, and budgets protected for program stability.

Like President Obama, Secretary Gates recognized the challenge in leading acquisition reform. It, however, is one thing for the executive branch to agree and another to work with other stakeholders to make

tough decisions on specific programs. "To do this," he said, "the President and I look forward to working with the Congress, industry, and many others" (Gates, 2009).

On May 20, 2009, Senator John McCain issued a floor statement in support of the U.S. Senate Armed Service Committee (SASC)'s Weapon Systems Acquisition Reform Act (Weapon Systems, 2009a), which would be signed into law just two days later. WSARA was as important for its substance as it was for the demonstration of bipartisanship (McCain, 2009). Congress was united in its pursuit of acquisition reform and in concert with similar efforts of the President and within DoD, as codified in Department of Defense Instruction 5000.2 (DoD, 2008).

The principal aim of WSARA was to improve the likelihood of success of major program acquisitions by focusing on decisions at their inception. WSARA reforms seek reliable and independent baseline cost estimates, rigorous early developmental testing and systems engineering oversight, and strong gatekeeping to prevent programs from proceeding with too much risk of immature technology. The goal of early risk reduction sought to facilitate the expanded use of fixed price contracts. Like the President, Congress also called for increased use of competition in WSARA to reduce costs.

A final WSARA reform of note was a strengthening of the "Nunn-McCurdy" process. Nunn-McCurdy provisions require DoD to report to Congress when cost growth on a major program breaches a critical cost growth threshold. Characterized by Senator McCain as "a big stick ... to wield against the very worst performing programs," the new legislation required a root-cause assessment of failing programs and presumed program termination within 60 days of notification unless DoD certified in writing to the contrary.

Within the first 80 days of the new presidential administration, key senior leaders in the executive and legislative branches of government united their visions and efforts to re-ignite a transformation of DoD weapons systems procurement. OMB subsequently issued numerous directives (Field, 2009a; 2009b; Gordon, 2009; Orszag, 2009a) as executive branch guidelines. Moreover, as the year ended, Under Secretary Dr. Ashton Carter signed out a "Directive-Type Memorandum" (2009) containing WSARA implementation instructions. Acquisition reform in the new century did not stop there.

In Search of Efficiency

On the 65th anniversary of Allied victory in Europe, Secretary Gates spoke publicly on defense spending. Calling upon the memory of President Eisenhower's leadership while in office, Secretary Gates agreed, "the U.S. should spend as much as necessary on national defense—but not a penny more" (Gates, 2010). He then went on to recognize that while the continuing demands of the military would require real growth in the defense budget of 2 to 3 percent annually, domestic economic pressures made that level of fiscal support unlikely. Gates concluded that DoD must pursue an Efficiencies Initiative to sustain the necessary growth without commensurate budget increases.

Secretary Gates and Under Secretary Carter asserted that their Efficiencies Initiative was different from acquisition reform, but key aspects of the initiative constitute a clear continuation of the transformation begun the previous year (Carter, 2010c). Objectives included calls for: delivering systems within budget; getting better buying power; restoring affordability programs; removing government impediments to leanness; and avoiding program turbulence. In a subsequent memorandum, Under Secretary Carter endorsed a claim that two-thirds of the savings could be found within existing programs by conducting them more efficiently and affordably (Carter, 2010b). Also noting that roughly half of the nearly $700 billion invested each year on defense is contracted-out, the initiative also seeks to improve industry productivity. Once again, there was recognition that change would be difficult and take time. Further, a total team effort that now included industry would be required.

Under Secretary Carter provided detailed implementation guidance to acquisition professionals in separate memos issued in September and November of 2010 (Carter, 2010a; 2010b). These memos culminated 21 months of acquisition reform since being sworn in. It is now appropriate to ask the question: Will this latest attempt at acquisition reform succeed where 60 years of effort have failed? One framework for analysis comes from the organizational change and culture models of Kotter and Schein (Kotter, 1996; Schein, 1992).

Why transformations fail. John P. Kotter (1996) approached his research by asking why transformation efforts fail. He concluded that eight fundamental errors can thwart success. Using these, he developed an eight-stage process to create major change. This article focuses on the first five, which are foundational to success.

Error No. 1: Allowing too much complacency. Establishing a sense of urgency is critical to gaining needed cooperation, and the first stage in Kotter's change process. Without urgency, members of the organization are unlikely to part with old, comfortable ways of doing business. The urgency must clearly demonstrate that the personal cost of not changing is higher than that of the change being requested. The continued existence of the organization and loss of one's job are good examples.

Error No. 2: Failure to create a sufficiently powerful guiding coalition. The second step is creating the guiding coalition. This step recognizes the fact that no single person can accomplish steps 3 through 8 single-handedly. Building a trusted team of powerful, expert, and credible leaders is essential early in the process.

Error No. 3: Underestimating the power of vision. Next, successful change requires developing a vision and a strategy. Compared to authoritarian decrees or micromanagement, Kotter believes that vision has the power to break through forces that support the status quo. Vision provides an image of the future that includes the inherent reason for its goodness. Good vision simplifies, motivates, and organizes.

Error No. 4: Undercommunicating the vision. Communicating the vision is step 4 of the process. Elements for successful visioning include simplicity of message, multiple forums for communication, and explanation of seeming inconsistencies. Most importantly, repetition of the message by leaders is essential. Repeating the vision not only ensures the message is received, but also underscores its importance.

Error No. 5: Permitting obstacles to block the new vision. Once the leadership team successfully conveys a sense of urgency and vision, organizational members should be empowered for broad-based action. This fifth step recognizes that members who support change may encounter barriers to action. These can be structural impediments, lack of skills, bad supervisors, or organizational systems and processes processes that get in the way. Removing these barriers will facilitate culture change.

How to change culture. In *Organizational Culture and Leadership,* Schein (1992, pp. 230–245) described how leaders use primary embedding mechanisms to create or change an organizational climate. Embedding mechanisms teach members of an organization how to perceive, think, feel, and behave in accordance with the desired

transformational outcome. The primary mechanisms are: what leaders pay attention to, measure, and control on a regular basis; how leaders react to critical incidents and organizational crises; how leaders allocate resources; deliberate role modeling, teaching, and coaching; how leaders allocate rewards and status; and how leaders recruit, select, promote, and excommunicate members. Through these mechanisms, leaders demonstrate, through their own behavior, what is important. Together, the models of Kotter and Schein provide a framework for analysis of the current acquisition reform efforts.

Likelihood of Success

Historically, acquisition reform has failed to achieve stated goals and objectives. Looking through the prism of Kotter's eight-stage process and Schein's embedding mechanisms, we can gain some insight into what to expect of the most recent efforts.

Sense of Urgency or Culture of Complacency?

Existing statements and actions to create a sense of urgency, step 1 in Kotter's change process, are unequivocal. In May 2009, President Obama invoked the specter of trillions of dollars of U.S. debt, the economic crisis, and the GAO's data on procurement inefficiency to argue his case. During the WSARA signing ceremony, he broadened his reform appeal by claiming it would "better protect our nation, better protect our troops" (Obama, 2009a). The SASC (Weapon Systems, 2009b) recorded similar views in part to increase awareness of the need for reform. Additionally, Secretary Gates (2009) tied his imperative to current missions and those in the future, and taking care of people. His Efficiencies Initiative goals alone add to the sense of urgency—which could not be achieved without change. These statements of urgency, coupled with leadership direction, are routinely passed along to the Defense Acquisition Workforce in official communications and other communications media (Carter, 2010d). Is this enough to overcome the inertia of the acquisition bureaucracy?

Urgency must overcome complacency. The statements and their motivational influence appear compelling, and yet challenges lie in human nature and mixed messages (Kotter, 1996). The Defense Acquisition Workforce is comprised of well-compensated employees with little threat to their employment status. Acquisition professional Dave Frick (2010) noted that the culture of DoD is risk averse and permeates the acquisition community. Such caution about the prospects of program

failure reinforces complacency to stick with existing "safe" practices. Frick challenged the community to embrace agile acquisition, which requires a culture that encourages risk taking and innovative thinking. With no direct cause-and-effect relationship (reward or consequences) between the declared urgency and employment or compensation, a problem that the now-failed National Security Personnel System attempted to address, the declared crisis might be safely ignored as someone else's problem (Corrin, 2009; Risher, 2010).

Mixed messages can also abet status-quo complacency. In the very address President Obama made when signing WSARA, he stated, "As Commander-in-Chief, I will do whatever it takes to defend the American people, which is why I've increased funding for the best military in the history of the world" (Obama, 2009a). He went on to say that waste was unacceptable, but if the United States will indeed cover the cost no matter what, how urgent can the situation be? Similar mixed messages are also coming from DoD and the SASC in their management of the F-35 program. Recently revealed to be over budget and over schedule again, the high-visibility program has already defied attempted reforms by being "too big to fail" (Martin, 2010). The Senate has also continuously added unrequested money to the budget for a second engine source, which DoD says is not needed (Shalai-Esa, 2010; Wolf, 2010).

Culturally, senior leaders may be failing to embed desired behaviors in the Defense Acquisition Workforce largely through how they react to organizational crises and critical incidents. With acquisition personnel feeling little personal risk and hearing mixed messages, the unintentional consequence may be that the status quo is not changed. A reviewer noted that this is the heart of the arguments posed by Kotter and Schein. While leaders may offer platitudes about organizational goals and objectives, it is essential that they present clear and compelling statements as to why things must change. Such statements must be accompanied with strategies and the means to enforce accountability. Given a path is established, metrics are essential to transforming the culture of acquisition professionals and providing consequences for those who do not get on board. In the Jim Collins "Good to Great" (2001) vernacular—get the wrong people off the bus. Collins noted that great organizations have a culture of rigor and discipline. One business leader exemplar interviewed in his book offered, "You can set your objectives for the year, you can record them in concrete. You can change your plans through the year, but

you never change what you measure yourself against" (p. 122). Without clearly expressed metrics and a culture of discipline, the status quo will erode the urgency to change.

Guiding coalition or top-down direction? The President, the Secretary of Defense along with his USD(AT&L), and two of the more powerful committees of Congress comprise a dream team of sorts. But, does that coalition include enough of the procurement enterprise to complete the transformation called for in acquisition reform? The pace of today's business environment, in addition to DoD's size, requires a powerful and empowered coalition in place that can decide, act, and lead as a team (Kotter, 1996). Such an entity does not appear to exist for acquisition reform.

An examination of the executive branch's organizational charts reveals many offices within the White House and DoD with roles in acquisition reform. The challenge is identifying a coherent, empowered, and representative coalition. Instead, guidance and decision making appears to be formulated within the Office of the Secretary of Defense and disseminated through top-down directives. This approach risks disempowering many constituents at the next level of "key" players. Perceived as part of the problem instead of part of the solution, these powerful leaders are a missing ingredient from Kotter's change coalition that are essential for success.

Culturally, the current approach appears to miss an opportunity to embed desired behavior. Establishing a guiding coalition gives leaders an opportunity to demonstrate preferences simply by whom they select and how their performance is evaluated. Making more formal use of a guiding coalition could also offer opportunities to exercise role modeling and coaching as a tool for transformation. Michael Kotzian, in his *Defense Acquisition Review Journal* award-winning paper (2010, pp. 158–181), asserted, "the importance of leadership...within DoD's acquisition community—is paramount...to overcome the resistance to policy change" (p. 161). Kotzian convincingly argued that while the majority of acquisition reform approaches focused on adjustments to processes and procedures, the critical enabler of change is the Defense Acquisition Workforce. The coalition to effectively guide change must come from within the community of practitioners. Despite the substantial efforts of senior acquisition leaders, there are still concerns with achieving

performance, cost, and schedule objectives as documented in the Congressional Research Service reports on defense acquisition (Chadwick, 2007; Schwartz, 2010).

Vision or decree? Slightly different interests motivate each group of potential change agents. The nexus of agreement seems to be the need to execute weapons procurement more efficiently, but beyond that, what vision will motivate change?

According to Kotter, a good vision conveys a picture of what the future will look like, appeals to the long-term interests of stakeholders, and comprises realistic, attainable goals. The Office of Defense Procurement and Acquisition Policy website offers the following vision statement: "Acquisition excellence through leadership with integrity" (Defense Procurement, n.d.). This says nothing about reform at all. An unofficial vision statement of sorts has recently appeared, "Do more without more" (Carter, 2010a). Whether this will inspire the workforce though, remains to be seen. It is also unclear what effect was intended by

abandoning the term "acquisition reform" in the Efficiencies Initiative, except perhaps to disassociate it from previous failures. One unintended consequence of all three statements, though, could be confusion. Exhortations for change can become background noise to be ignored by the more complacent members of the organization.

Culturally, a clear and compelling vision statement could be used to identify what leadership will pay attention to during the transformation. One of Schein's embedding mechanisms is that leaders are engaged in deliberate role modeling, teaching, and coaching (pp. 240–242). If reform is important, then it should be captured in the vision and part of every formal and informal communication. A few well-thought out sentences could expand on the existing goals to include a general strategy for getting there: a strategy that could be followed up with metrics to track progress. Acquisition senior leaders should seize opportunities to engage in conversations with the Defense Acquisition Workforce and demonstrate through their words and actions that reform is essential.

Empowered change or structural barriers? Kotter revealed the impact on change efforts, like acquisition reform, that formal structures and personnel systems can have. Stated simply, the way an organization is structured—its rules of behavior or formal processes (Schein's reinforcing mechanisms) and the incentives inherent in a reward system (embedding mechanisms)—can thwart employees' intended support of any change effort. Without effective embedding mechanisms for acquisition reform, powerful internal and external stakeholder groups are not required or incentivized to assist the change effort. The requirements and budget communities, for example, have unique interests that may not include on-time and on-budget delivery. The defense industry itself may also not be inclined to change if it affects profitability. Similarly, prescriptive rules governing program execution can also unintentionally establish their own barriers to change. The 2009 WSARA legislation alone established, in law, detailed rules of program execution in areas such as milestone certification, systems engineering, and competition. Adherence to these new rules is mandatory, and expensive bureaucracy must exist to ensure compliance.

There is also the issue of incentive. Is employee performance in the acquisition community, both military and civilian as well as stakeholders, evaluated on the basis of acquisition reform goals? Some critics assert that rewards are usually based on achieving the unit mission

and may not be tied to acquisition reform outcomes. This can lead to suboptimized performance or even frustration at the employee level or, as Kotter put it, barriers to empowerment.

In "A Ten-Year Review of the Vision for Transforming the Defense Acquisition System," Rogers and Birmingham (2004, pp. 37–59) noted that DoD acquisitions are subjected to political influence to the point where critics hold there is little hope for real reform. The two authors contend, however, that leaders within the bureaucracy have the professional obligation to drive improvements with clear change visions. This requires restructuring organizations, processes, and systems to transform the acquisition community. One such structural change is a proposal to institute Acqusition Centers of Excellence to provide efficiencies through joint (cross-Service) and collaborative effort (Starks, 2008, pp. 28–32). The tendency of organizations is to default to reinforcing mechanisms to change organizational structure—to "rearrange the deck chairs" rather than address the fundamental problems of senior leadership and direction. Program manager Thomas Miller (November–December 2010, p. 30) identified root causes as "an unequal distribution of power and influence [combined] with systemic disincentives." Much needs to be accomplished to refute a RAND study that found "insufficient cultural, organizational, and intellectual change in the DoD" and "serious structural and cultural impediments that hinder the ability of the acquisition process to deliver desired outcomes" (Hanks, Axelband, Lindsay, Malik, & Steele, 2005, pp. 67, 142).

A Path to Viable Acquisition Reform

Sixty years of acquisition reform has yielded a procurement system that requires more reform (GAO, 2011). In 2009, President Obama took office and joined forces with the incumbent Secretary of Defense along with an interested and motivated Congress to give it another try. Recognizing that the scope and level of effort called for are nothing short of transformational, we selected five elements of Kotter's eight-stage process for change and used Schein's concepts of embedding mechanisms for organizational culture to analyze this latest effort's likelihood of success.

Based on this analysis, the prospects for lasting reform are gloomy. Efforts to establish a compelling argument for change among the Defense Acquisition Workforce and stakeholders are undercut by mixed messages such as "whatever it takes." It also does not appear as though an effective

guiding coalition or unifying vision exists that can motivate change and embed its ideals into the culture of the acquisition community. In addition, important barriers to empowerment remain in place.

"Culture isn't just one aspect of the game –it is the game." (Gerstner, 2002, p. 182)

Former IBM Chief Executive Officer Lou Gerstner observed that no enterprise would succeed unless elements of success are embedded in its DNA. To overcome inefficiency in acquisition totaling $296 billion, the ad hoc leadership team needs to go beyond peripheral recognition of the importance of culture change as a component of transformation and instead embrace it as the centerpiece of true reform. Using Schein's cultural embedding mechanisms, we suggest the following.

DoD should clarify, simplify, and standardize metrics by which it measures success, then pay attention to those metrics and hold people accountable for them. We recommend outcome-based measures that prudently balance performance with schedule and cost. This focus could form the basis for a simple, compelling, and unifying vision such as *DoD Procurement Promised Performance, On Time, On Budget*. Performance is the sine qua non of acquisition programs; hence, its measures retain prime importance while in tension with factors of schedule and cost. Monitoring and adapting performance metrics form the trade space to preserve on-time and on-budget outcomes.

DoD should also formally identify its guiding coalition, recognizing that acquisition program outcomes are influenced by stakeholders outside the professional acquisition corps. That coalition should be empowered and used as an embedding mechanism of cultural change: deliberate role modeling, teaching, and coaching; allocation of rewards and status; and recruitment, selection, and promotion. Flag officers and senior civilians, to include those in department and Service-level headquarters, warfighter resource representatives, and support agencies should be included. Recognizing this has the potential to be a large group, a tiered management approach could be used to retain some efficiency while taking advantage of the breadth and depth of the coalition's reach.

Importantly, using the measures of merit identified above, *all* members of this group should in some way be accountable for the outcomes of the programs in which they have a stake. This action is crucial in pursuit of what Schein calls "cognitive restructuring" (1992, p. 325), where individuals become open to new information and ways of thinking. Through broad enforcement of the new standards, this advocacy group will be motivated to set the example that their members can imitate. There, however, is the proverbial rub. Given that many members seek to represent the interests of their constituents and can say no with impunity, it is necessary to provide transparency in the process, document dissent, and hold members accountable for their actions as contributors to achieve reform and transformation.

Conclusions

This article opened with the question, "But, will it all work?" Through an analysis that applied Kotter's model of organizational change and Schein's approach to organizational culture and leadership, our conclusion suggests not. Behavioral change is needed to cause transformation. Acquisition reforms can be coerced, but will not endure as true transformation unless cultural change occurs. Success requires commitment to change over simple compliance to superficial rewards and consequences. Effective reform requires embedding leadership actions and institutional processes to drive change in the culture of defense acquisition. It is time to undertake a long-term, culturally focused effort to transform DoD's acquisition process.

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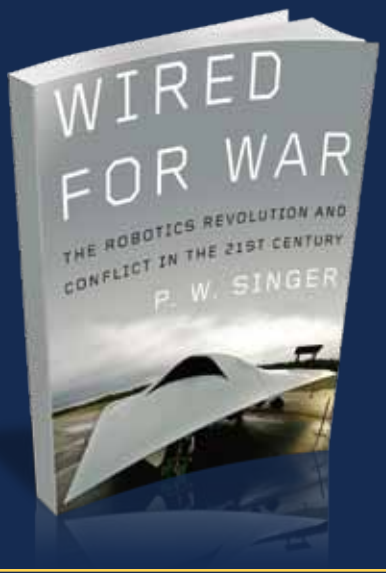
Professional Reading List

The Defense Acquisition Professional Reading List is intended to enrich the knowledge and understanding of the civilian, military, contractor, and industrial workforce who participate in the entire defense acquisition enterprise. These book reviews/recommendations are designed to complement the education and training that are vital to developing the essential competencies and skills required of the Defense Acquisition Workforce. Each issue of the *Defense Acquisition Research Journal (ARJ)* will contain one or more reviews of suggested books, with more available on the *ARJ* website.

We encourage *ARJ* readers to submit reviews of books they believe should be required reading for the defense acquisition professional. The reviews should be 400 words or fewer, describe the book and its major ideas, and explain its relevance to defense acquisition. Please send your reviews to the Managing Editor, *Defense Acquisition Research Journal*: *Norene.Fagan-Blanch@dau.mil.*



Featured Book

Wired for War: The Robotics Revolution and Conflict in the Twenty-first Century

Author(s):
P.W. Singer

Publisher:
The Penguin Press

Copyright Date:
2009

ISBN:
9781594201981

Hard/Softcover:
Hardcover, 438 pages

Reviewed by:
Sydney Coelho, former publications assistant, *Defense Acquisition Research Journal* (*ARJ*), Fort Belvoir, VA

Review:

In his 2009 book *Wired for War: The Robotics Revolution and Conflict in the Twenty-first Century*, P.W. Singer answers a plethora of technological questions generated by the complexities of digital warfare—questions to which answers have become increasingly vital for the acquisition professional as well as the warfighter on the battlefield. Citing films such as "The Matrix" and "A.I." in comparison, Singer illustrates the very real use of robotics in modern warfare, and to what extent such technologies might be used to meet an existing or perceived threat. Leveraging his knowledge and background as both a robotics enthusiast and a researcher of private military firms, Singer describes how the robotics industry and the government are squaring-off on the battlefield and beyond. From war tactics and lasers, to super-bots and artificial limb construction, Singer takes his readers on a guided tour of the artificial intelligence industry and neatly points out the pros and cons of how society interacts with machines.

Readers familiar with the art and tactics of warfare know that "a dense set of rules defines what is right or wrong in battle. These rules find their origin in everything from the Bible to the Geneva Conventions" (Singer, p. 382). What would happen, however, if these rules were changed and redefined? Singer suggests that while technology has its advantages, uncertainty remains about how to contain such rules and laws of combat should something go awry; and while governments around the globe are aware of possible problems associated with artificial technology, they are still in the beginning stages of defining what these problems might be and how to combat them.

Acquisition professionals will find this book helpful not only because of what it has to offer [in the view of this reader, significant insight into the world of technological warfare], but also because of what it does not. In fact, they may find themselves reconsidering the decisions they make—decisions that once seemed so simple may now harbor new and unseen consequences that could potentially put the warfighters they are trying to support and protect on the battlefield in greater danger. As Singer concludes from his research, a vast amount of grey areas in developing and navigating the complexities of digital warfare are challenging, and will continue to challenge, the defense acquisition professional. Singer presses his readers to keep this in mind when weighing any decisions that have the potential for not only a war with people, but a war with machines.

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